

**COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

for

**B.Tech Four Year Degree Course  
(A-18 I & II year)**

in

**ELECTRICAL AND ELECTRONICS ENGINEERING  
(EEE)**

(Applicable for the batches admitted from 2018-2019)



**SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY**  
**(An Autonomous Institution approved by UGC and affiliated to JNTUH)**  
(Accredited by NAAC with 'A' Grade and Accredited by NBA of AICTE)  
Yamnampet, Ghatkesar, Malkajigiri Medchal District -501 301.

**SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY (AUTONOMOUS)****B.Tech in Electrical & Electronics Engineering****Course structure for B. Tech I Year I Semester EEE (2018-19)**

Sl.No	Course code	Name of the Course	L	T	P	C	Max Marks	
							CIE	CIE
1.	7HC05	Engineering Physics	3	1	0	4	30	70
2.	7FC01	Problem Solving using C	3	0	0	3	30	70
3.	7HC06	Engineering Mathematics – I	3	1	0	4	30	70
4.	7BC02	Engineering Graphics & Design	1	0	4	3	30	70
5.	7HC02	English (Oral communication skills)	1	0	0	1	30	70
6	7HC20 (Mandatory)	Human Values and Professional Ethics in Higher Studies	2	0	0	0	30	70
							Grade Evaluation	
7	7HC65	Engineering Physics lab	0	0	3	1.5	30	70
8	7FC71	Problem Solving using C Lab	0	0	3	1.5	30	70
9	7HC62	English (Oral communication skills) Lab	0	0	2	1	30	70
10	7A191	Technical Seminar - I	0	0	2	1	100	--
Total			11	2	14	20	370	630

**Course structure for B.Tech I Year II Semester EEE (2018-19)**

Sl.No	Course Code	Name of the Course	L	T	P	C	Max Marks	
							CIE	CIE
1.	7HC03	Chemistry	3	1	0	4	30	70
2.	7A201	Electrical Circuits and Networks-I	3	0	0	3	30	70
3.	7HC08	Engineering Mathematics – II	3	1	0	4	30	70
4.	7BC01	Workshop/Manufacturing practices(Theory)	1	0	0	1	30	70
5.	7HC63	Chemistry lab	0	0	3	1.5	30	70
6.	7AC61	Electrical Circuits and Networks Analysis Lab	0	0	2	1	30	70
7	7HC01	English ( Reading, Listening and writing)	1	0	0	1	30	70
8	7BC61	Workshop/Manufacturing practices Lab	0	0	3	1.5	30	70
9	7HC61	English (Reading, Listening and writing) Lab	0	0	2	1	30	70
10	7A292	Technical Seminar - II	0	0	2	1	100	--
Total			11	2	12	19	370	630

**II Year – I Semester**

S. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7HC13	Transformation Techniques and Numerical methods	2	---	---	2	30	70
2	7C302	Digital Logic Design	2	1	---	3	30	70
3	7C301	Electronic Devices and Circuits	3	---	---	3	30	70
4	7A302	Electro Magnetic Fields	4	---	---	4	30	70
5	7A303	Electrical Machines – I	3	---	---	3	30	70
6	7A304	Electrical Circuits & Networks – II	3	---	---	3	30	70
7	7BC04	Elements of Mechanical Engineering	2	---	---	2	30	70
8	7HC21	Environmental Science and Ecology	2	---	---	---	30	70
							Grade Evaluation	
9	7C371	Electronic Devices and Circuits Lab	---	---	2	1	30	70
10	7A373	Electrical Machines Lab – I	---	---	2	1	30	70
11	7A393	Technical Seminar - III	---	---	2	1	100	--
<b>Total</b>						<b>23</b>	<b>400</b>	<b>700</b>

**II Year – II Semester**

S. No.	Subject Code	Subject	L	T	P/D	C	Max Marks			
							CIE	SEE		
1	7HC15	Probability Theory and Statistics	2	--	---	2	30	70		
2	7A405	Electrical Machines – II	3	--	---	3	30	70		
3	7A406	Power System – I	3	--	---	3	30	70		
4	7AC07	Control Systems	3	--	---	3	30	70		
5	7C405	Analog Circuits	3	--	---	3	30	70		
6	7ZC01	Management Science and Financial Accounting	2	--	---	2	30	70		
7	7A475	Control Systems & Simulation Lab	--	--	2	1	30	70		
8	7C474	Analog Circuits Lab	---	---	2	1	30	70		
9	7A494	Technical Seminar - IV	---	---	2	1	100	--		
10	7A472	Comprehensive Viva - I	---	---	--	1	30	70		
11	7HC21	Environmental Science and Ecology	2	--	--	--	30	70		
12		Summer Industry Internship - I	Evaluated in III-year I-Semester							
<b>Total</b>						<b>20</b>				

A	b	c	d	e	f	g	h	i	j	k	l
X		X					X				

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**ENGINEERING PHYSICS**

**Code: 7HC05**

**L T P C  
3 1 0 4**

*Course Objectives:*

- To know about the semiconductors, types, carrier concentration, Thermistor, Hall effect and also to understand the concept of PN-junction, I-V Characteristics, LED, Solar Cell and Photo diode.
- Explain about the Quantum Mechanics to understand wave particle duality, necessity of quantum mechanics to explore the behavior of sub atomic particles. Schrodinger's Time Independent Wave Equation, Physical Significance of the Wave Function – Application of Schrodinger wave equation.
- To understand the basic concepts of normal light, Laser and its applications and to know about the fiber optics, principle (TIR), Numerical Aperture, Types of optical Fibers, Step index and graded index Fibers, attenuation in optical fibers. Applications: optical fiber communication system, fiber optic sensors, medical endoscopy.
- To study the concepts of magnetism and superconductivity, Bohr magneton, Hysteresis nature, domain structure, Meissner effect, types of superconductors, BCS theory and applications of superconductors.
- To understand the concepts of dielectrics, polarizations and its types, internal fields, Clausius-Mossotti equation, Frequency and temperature effect on dielectrics and its applications – Piezo-electricity, pyro-electricity and ferro-electricity.
- To discuss about the nano-technology, preparation techniques and characterization (XRD, SEM & TEM), CNTs and to know about the fundamentals of radioactivity and its applications.

**Unit:1**

**Semiconductors**

Fermi Level in Intrinsic and Extrinsic Semiconductors, calculation of carrier concentration of Intrinsic and Extrinsic Semiconductors, Direct & Indirect Band Gap Semiconductors, Thermistor, Hall Effect in semiconductors and applications.

**Semiconductor devices**

Formation of PN Junction and working of PN Junction, Energy Diagram of PN Diode, Diode equation (Quantitative treatment), I-V Characteristics of PN Junction, Application - LED, Solar Cell and Photo diode.

**Unit:2**

**Wave nature of particles, Schrodinger equation and its application**

Waves and Particles, de Broglie Hypothesis, Matter waves, Davisson and Germer's Experiment, G.P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrodinger's Time Independent Wave Equation – Physical Significance of the Wave Function – Application of Schrodinger wave equation - Particle in One Dimensional Potential Box.

**Unit:3**

**Lasers**

Characteristics of LASER, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them and significance, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers.

**Fiber optics**

Introduction, Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers, Step index and graded index Fibers Attenuation in Optical Fibers. Applications: Optical Fiber communication system, Fiber Optic Sensors, Medical Endoscopy.

**Unit:4****Magnetic and Superconducting materials**

Permeability, Field Intensity, Magnetic Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton. Hysteresis behavior of Ferro Magnetic materials based on Domain theory. Hard and Soft Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their applications,

**Super conductivity**, effect of Magnetic Field, Critical current density, Meissner effect, Type-I and Type-II superconductors, BCS theory, applications of superconductors.

**Unit:5****Dielectric materials and their properties**

Electric Dipole, Dipole Moment, Dielectric Constant, Electric Susceptibility, Electronic and Ionic polarizability (Quantitative) Orientation Polarization (Qualitative), Internal fields in Solids, Clausius - Mossotti equation, Frequency and temperature effect on Dielectrics (Qualitative), Applications - Piezo-electricity, Pyro-electricity and Ferro-electricity.

**Unit:6****Nanotechnology**

Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication, Sol-gel, Precipitation, Chemical vapor Deposition(CVD); Top-down Fabrication; Thermal evaporation, Ball Milling, Characterization of Nano materials (XRD&TEM), carbon nano tubes(CNTs), Applications of Nano Materials.

**Nuclear Energy:** Radioactivity, Nuclear binding energy, Nuclear fission, Nuclear fusion,  $\alpha$ ,  $\beta$ ,  $\gamma$  rays decay, Geiger-Muller counter and practical applications of nuclear physics.

**Text Books:**

- 1.B.K. Pandey & S. Chaturvedi Engineering Physics, Cengage Learning
- 2.D.K. Bhattacharya and Poonam Tandon, OXFORD university press.

**Reference Books:**

1. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher
2. A.S. Vasudeva , Modern engineering Physics, S Chand
3. Dekker, Solid State Physics
4. Dr.M.N. Avadhanulu, Engineering Physics, S Chand
5. Dekker, Solid State Physics
6. Halliday and Resnick, Physics
7. S.O. Pillai, Solid State Physics
8. P K Palanisamy, Engineering Physics, Sitech Publications
9. A. Ghatak - Optics

**Course Outcomes:** *After completing the course, students will be able to*

- Explain semiconductor behaviour, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN-junction, I-V characteristics, LED, solar cell, photo diode and their applications.
- Differentiate the wave and particle, de-Broglie matter waves-its experimental evidence, Schrodinger's wave concept and its application for a particle in one dimension box.
- Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy)
- Reveals about the magnetism-its origin and types, Hysteresis, domain theory, Anti-ferro and ferri magnetism superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.
- Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity).
- Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**PROBLEM SOLVING USING C  
(Common to All Branches)**

**Code: 7FC01**

L	T	P	C
3	0	0	3

**Course Outcomes: After completion of this course student will learn**

1. To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs (in C language)
2. To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

**UNIT I**

**Introduction to Programming:** Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)

**Idea of Algorithm:** steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code

**UNIT II**

**History of C language, Characteristics of C language, Structure of C Language, C Tokens**

Arithmetic expressions, Operator Precedence & Associativity

Conditional Branching and Loops

Writing and evaluation of conditionals and consequent branching and **Jumping Constructs**

**Pretest and Post test**, Iteration and loops (3 lectures)

**UNIT III**

**Function:** Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, **Storage Classes**

**Recursion:** Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

**UNIT IV**

**Arrays:** Arrays (1-D, 2-D), Character arrays **Ragged Arrays and Dynamic Arrays**

Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Quick sort or Merge sort.

**UNIT V**

Pointers Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notation of linked list (no implementation) **Dynamic Memory allocation Functions.**

**Strings: String Handling Functions.**

**UNIT VI**

Structure: Structures, Defining structures and Array of Structures,

**Nested Structures enum, typedef**

File handling (only if time is available, otherwise should be done as part of the lab)

**File Handling Functions, File Modes, File Operations**

**Suggested Text Books**

- (i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- (ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill Suggested

**Reference Books**

- (i) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

a	b	c	d	e	f	g	h	i	j	k	l
H	M	M								L	

**H: High      M: Medium      L: Low**

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**ENGINEERING MATHEMATICS -1  
(Common to EEE, ECE, ME, CE)**

**Code: 7HC06**

**L    T    P/D    C**  
**3    1    0    4**

*Pre Requisites: Mathematics Knowledge at Pre-University Level*

*Course Objectives: To make the students to understand and expected to learn*

1. Special functions such as Beta & Gamma functions and their properties, evaluation of improper integrals and the applications of definite integrals.
2. Mean value theorems and their applications to the given functions, series expansions of a function.
3. To test the convergence of a series and expansion of a function in sine and cosine terms.
4. Basic concepts of multivariable differential calculus.
5. About the linear system and some analytical methods for solution.
6. Concept of Eigen values and Eigen vectors their properties and applications.

**Module 1: Calculus**

Evolute and involute; Beta and Gamma functions and their properties; Evaluation of improper integrals, Applications of definite integrals to evaluate surface areas and volumes of revolutions.

**Module 2: Calculus**

Rolle's Theorem and Mean value theorems (Statements and Geometrical Interpretations if any); Taylor's and Maclaurin's theorems with remainders (without proof); Taylor's and Maclaurin's series expansion.

**Module 3: Sequences and series**

Convergence of sequence and series, tests for convergence; Power series. Fourier series, Half range sine and cosine series, Parseval's theorem (without proof).

**Module 4: Multivariable Calculus (Differentiation):**

Limit, continuity and partial derivatives, total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, Tangent plane; Concepts of divergence and curl with physical significance.

**Module 5: Matrices:**

Inverse of a matrix by Gauss Jordan method, rank of a matrix; System of linear equations- Rank method/Gauss Elimination method. Symmetric, skew-symmetric and orthogonal matrices;

**Module 6: Matrices:**

Eigenvalues and Eigenvectors; Cayley - Hamilton Theorem, Diagonalization of matrices and Orthogonal transformation.

**Text Books:**

- (i) R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
- (ii) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.



**Reference Books:**

- (i) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- (ii) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- (iii) B.S. Grewal, Elementary Engineering Mathematics, Khanna Publishers
- (iv) C Sankaraiah, A Text book of Engineering Mathematics – I, VGS Book Links
- (v) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- (vi) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
- (vii) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
- (viii) Engineering mathematics, Ravish R.Singh, Mcgraw Hill Education.

**Course Outcomes:** *After the course completion the students will be able to*

1. *Solve the problems using special functions; evaluate surface areas and volumes of revolutions.*
2. *Verify the mean value theorems and also express the given function in series form using Taylor's theorem.*
3. *Determine the convergence, divergence or oscillating nature of a series and express the function as trigonometric series.*
4. *Compute the extreme values of a function defined with and without constraints.*
5. *Check the consistency or inconsistency of a linear system and ability to solve real time problems.*
6. *Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation.*

1	2	3	4	5	6	7	8	9	10	11	12
H											M

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**ENGINEERING GRAPHICS & DESIGN**

**Common to B.Tech I year I sem (EEE, ECE & ME) and II sem (CSE, ECE, IT & CE)**

**Code : 7BC02**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	0	4	3

**Course objectives:**

- 1: To teach students the basic principles of Engineering graphics and instruments used
- 2: To introduce the concept of projections in drawing and its applications for simple drawing entities
- 3: To impart the knowledge of various types of solids and their projections in different position wrt principle planes
- 4: To teach the concept of sections of solids and their applications
- 5: To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.
- 6: To train the students for the extraction of multiple views from a solid model using AutoCAD

**Course outcomes**

After completing this course, the student will able to:

- 1) Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
- 2) Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
- 3) Draw projections of different types of regular solids in various positions wrt principal planes of projection
- 4) Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
- 5) Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
- 6) Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software

**UNIT – I**

**Introduction to Engineering Drawing:** Drawing Instruments and their uses, types of lines, Types and uses of pencils, Lettering, Rules of dimensioning.

**Curves used in Engineering Practice and their Constructions:**

Conic Sections including Rectangular Hyperbola - General method, Cycloid, Epicyloid, and Involutés of circles.

**UNIT – II**

**Orthographic Projection:** Principles of Orthographic Projections – Conventions – First angle and third angle projections (however all drawing exercises must be in first angle only) - Projection of Points, Lines - Inclined to both planes, Projections of regular Plane, inclined planes - Auxiliary views.

**UNIT – III**

**Projections of Regular Solids:** Projections of Regular Solids: Prisms, Cylinders, Pyramids, Cones – Axis inclined to both planes, Auxiliary views.

**UNIT – IV**

**Sections and sectional views of Solids:** Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

**Development of Surfaces:** Development of Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their sections.

**UNIT – V**

**Isometric Projections/views:** Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane, Simple Solids. Conversion of isometric views to orthographic views.

**UNIT –VI**

**Overview of Computer Graphics :** Demonstrating features of the CAD software - The Menu System, Toolbars, , Dialog boxes and windows, Drawing entities - lines, circles, arcs etc and editing commands, Dimensioning of objects, 2D drawings-simple exercises , 3D wire-frame and shaded solids- Commands, Boolean operations.

**Text/Reference Books:**

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- (iv) Narayana, K.L. & P Kanniah (2008), Text book on Engineering Drawing, Scitech Publishers
- (v) AUTOCAD Software Theory and User Manuals

a	b	c	d	e	f	g	h	i	j	k	l
							X	X	X		X

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**ENGLISH - Oral Communication Skills**

Common to I Year I Semester (ECE, EEE and MECH) and II Semester (ECM, CSE, IT and Civil)

**Code: 7HC02**

**L T P C  
1 0 0 1**

*Course Objectives* : The course will develop the students' ability to

- integrate listening and speaking skills
- communicate effectively
- speak effectively on a given topic
- master the art of presentation
- interact with peers in a group discussion
- get exposed to face interviews

*Course Outcomes* : After completing the course students will be able to

- understand, analyze and respond to the audience by listening effectively
- acquire the articulation of different types of sentences by practicing pause patterns and question tags.
- translate and demonstrate self, participate effectively in activities like JAM, extempore
- express and deliver a presentation on the given topic through role plays and situational dialogues
- implement English language to meet the standards of corporate and real world in a group.
- present and communicate effectively by facing mock interviews by experts from industry and academy.

**Unit-I: Listening Skills**

- 1.1 Integrating Listening, Reading and Speaking
- 1.2 Introduction Integrated Speaking Skills

**Unit-II: Oral Communication Skills -I**

- 2.1 Types of Sentences – Assertive, Interrogative, Imperative and Exclamatory
- 2.2 Difference between Pauses, Gaps
- 2.3 Question Tags
- 2.4 Introduction and Greetings
- 2.5 Asking and Giving Directions

**Unit-III: Oral Communication Skills -II**

- 3.1 Speaking on a particular topic
- 3.2 Content development using cohesive devices
- 3.3 Common Errors in Spoken English

**Unit-IV: Presentation skills**

- 4.1 Introduction to Presentation Skills
- 4.2 Role Plays & Situational Dialogues

**Unit-V: Group Discussion**

- 5.1 Importance of Group Discussion
- 5.2 Do's and Don'ts of Group Discussion

**Unit-VI: Interview Skills**

- 6.1 Introduction to Interview Skills
- 6.2 Types of Interviews
- 6.3 Pre-Interview Preparation
- 6.4 Interview Etiquette (Non-Verbal)

**Suggested Readings:**

- (i) *Step by step learning language and life skills* by Niruparani, Jayasree Mohanraj, Indira, Sailakshmi  
Pearson Publishers
- (ii) *Communication skills for technical students* by TM Farhathullah, Orient Black swan Publications
- (iii) *English for technical Communication* by K.R. Lakshmi Narayan , Scitech Publications
- (iv) *Practical English Usage*. Michael Swan. OUP. 1995.
- (v) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- (vi) *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

a	b	c	d	e	F	G	h	i	j	k	l
							X	X	X		X

**Syllabus for B. Tech I Year I semester**  
**Electrical and Electronics Engineering (EEE)**  
**HUMAN VALUES AND PROFESSIONAL ETHICS IN HIGHER EDUCATION**  
**Common to All Branches**

**L T P C**  
**3 - - -**

**Code: 7HC20**

**Orientation Programme for First Year B.Tech Students Syllabus**

**Course Duration:** Three Weeks      **Evaluation:** Is done based on the Grading.

**Course Objectives** This introductory course input is intended

- To help the students appreciate the essential 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature. Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.

**Course Outcomes:** Student will be able to:

- Learns Being a human, understands human values and purpose of education
- Understands the importance of different harmony levels needed.
- Understand self and being in the current moment are the sources of happiness.
- Improves Learning capabilities and communication skills.
- Understands and appreciate the importance of personality development and yoga for a holistic life.
- Understands the essence of Morals, Ethics, Values and Social responsibilities for successful life.

**UNIT – I: INTRODUCTION TO HUMAN VALUES:** The current status of an individual, at the level of Individual, Family, Society and Nature. Basis of Human Beings' Conduct, Desire – Aim, Objective and Purpose. Rationale of Success. Role of Education - Sanskar. Definition of Human aspiration, Human Conduct, Human Being – Physical Facility and Relationships, Right Understanding for Human Being, Achievement of Prosperity.

**UNIT – II: HARMONY AND HUMAN BEING:** Understanding the co-existence of human being, Different Harmony levels –Harmony in the Human Being, Harmony in the Family, Harmony in the Society and Harmony in Nature / Existence. Understanding the Relationships, Harmony in the Family, Feelings in Relationship: Trust, Respect, Affection, Care Guidance, Reverence, Glory, Gratitude and Love.

**UNIT – III: THE CYCLE OF HAPPINESS:** Meaning of Happiness and Unhappiness, Sources of Happiness, Self Investigation, Five Dimensions of Human order – Education, Health, Production, Justice and Exchange. Harmony at the Individual Level and Family level, Concerns at Individual, Family and Nature level. Different approach of People behavior – Active, Reactive and Proactive. Resource depletion, Global Warming, Pollution, Harmony in Nature.

**UNIT – IV: IMPROVING LEARNING CAPABILITIES:** Principles of learning, Study skills and E-Learning, Listening skills, Soft skills and Employability skills, Effective Reading and Reviewing, Reading Comprehension, Textbook Reading strategies, Effective Communication in English, Test taking strategies.

**UNIT – V: PERSONALITY DEVELOPMENT:** Self Development, Goal Setting, Motivation, Time Management, Positive Attitude, Building Self Confidence, Decision Making, The Discovery Wheel, Some attributes of a good personality, Memory Management, Interpersonal Skills, Importance of Yoga and Meditation.

**UNIT – VI: ROLES AND RESPONSIBILITIES OF STUDENTS:** Responsibilities of the students in shaping themselves, Effective and Successful Habits, Difference between studying in a Professional college and High school / Junior college, Characteristics of a Successful Student, Morals, Ethics and Values, Some tips to students to do well in B.tech program and also later in Professional Career.

**TEXT BOOK:**

- Improving Learning Capabilities and Personality Development – Manual prepared by SNIST for private circulation

a	b	c	d	e	F	G	h	i	j	k	l
X		X									

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**ENGINEERING PHYSICS LAB  
Common to I-Year I-Sem (EEE & ECE) and II-Sem (CSE, IT & ECM)**

**Code: 7HC65**

**L T P C  
- - 3 1.5**

**Course Objectives:**

- To study the concepts (numerical aperture) of a optical fiber,
- To explain about magnetic induction, Biot-Savart principle.
- To discuss the energy gap ( $E_g$ ) of a semiconductor diode.
- To understand the rigidity modulus, periodicity.
- Understand the concept of photo electric effect using photo voltaic cell.
- To understand about the ionizing radiation by using the Geiger–Muller counter.
- Discuss the dispersive power of prism-minimum deviation method.
- Explain the formation of Newton’s rings-interference
- Study the frequency of AC mains using Sonometer.
- To study the LED characteristics and forward resistance
- Explaining about the electrical resonance by using the LCR circuit
- To know the time constant of RC circuit

**List of Experiments**

1. Determination of a Numerical Aperture (NA) of an optical fiber – Fiber optics.
2. Determination of magnetic induction flux density along the axis of a current carrying circular coil using Stewart and Gee’s experiment - Magnetism.
3. Determination of the energy gap ( $E_g$ ) of a given semiconductor-Temperature/semiconductor
4. Determination of rigidity modulus of a given wire material using the Torsional pendulum - Vibrations
5. Determination the Planck’s constant using the photo voltaic cell - Photo voltaic cell
6. Studying the characteristics of Geiger–Muller counter and verifying the inverse square law - Nuclear physics
7. Calculation of dispersive power of a given material of prism by using Spectrometer in minimum deviation method - Light.
8. Determination of wavelength of a monochromatic light source by using Newton’s rings experiment - Light
9. Calculating the frequency of AC supply by using the Sonometer – Electromagnetic/ Electrical
10. Studying the characteristics and calculating the forward resistance of a LED – Semiconductor/devices.
11. Study of series and parallel resonance of an LCR circuit – Electrical devices
12. Determination of time constant of an RC-circuit – Electrical/ Electronics

**NOTE:** Any **TEN** of the above experiments are to be conducted.

**Course Outcomes:**

*After completing the experiment, students will be able to*

- *Analyze the concepts of fiber optics, fundamentals, numerical aperture its importance, attenuation in fiber and applications.*
- *Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law.*
- *Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance.*
- *Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.*
- *Understand the concepts of photo electric effect, importance, photo current, colour filters, optical sensors (photo voltaic cell).*
- *Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law.*
- *Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement.*
- *Understand the concepts of interference, conditions, formation of Newton's rings-reason.*
- *Know the difference between AC and DC fundamentals, magnetostriction, resonance, air column vibrations.*
- *Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.*
- *Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals.*
- *Characterize the RC network, time constant, capacitor functioning and its application.*



**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**PROBLEM SOLVING USING C LAB  
(Common to All Branches)**

Code: 7FC71

L	T	P	C
0	0	3	1.5

*Course Outcomes: After completion of this course student will learn*

1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program
3. To be able to correct syntax errors as reported by the compilers
4. To be able to identify and correct logical errors encountered at run time
5. To be able to write iterative as well as recursive programs
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in defining self referential structures.
8. To be able to create, read and write to and from simple text files.

**[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given]**

**1. Unit I (Cycle 1)**

1. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
2. Write an algorithm to find the largest of three given numbers and draw a flowchart.
3. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
4. Write an algorithm and flowchart for finding the first n Fibonacci numbers, give n.

**2. Unit II (Cycle 2)**

1. Write an algorithm, flowchart, and C program for:
  2. Finding the area and circumference of a circle of given radius.
  3. Finding the volume of a sphere of given radius.
  4. Finding the lateral surface area of a right circular cone of given base radius and height.
  5. Finding selling price of an item, given its cost price and profit percent.
  6. Finding the interest on a given principal for a given period of time at a given rate of per year.
7. Write a C program to display all the sizes of data types in C.
8. Write a C program to display a given decimal integer into an equivalent octal number and hexadecimal number using %o and %x in printf function.

**3. Unit II (Cycle 3)**

1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
2. Write a C program for finding the largest of three given numbers.
3. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.

**4. Unit III (Cycle 4)**

1. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
2. Write a C program to compute the sum of:
3.  $1+x+x^2+x^3+\dots+x^n$ , given x and n.
4.  $1! + 2! + 3! + \dots + n!$ , given n.

- 
5.  $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \dots$  to  $n$  terms where the  $n^{\text{th}}$  term becomes less than 0.0001.
- 5. Unit III (Cycle 5)**
1. Write a C program in the menu driven style to perform the operations +, -, \*, /, % between two given integers.
  2. Write a C program to find the largest and the least of some numbers given by the user.
  3. Write a C program to find the sum of the digits of a positive integer.
- 6. Unit III (Cycle 6)**
1. Write C functions for the following:
    - a) A function that takes an integer  $n$  as argument and returns 1 if it is a prime number and 0 otherwise.
    - b) A function that takes a real number  $x$  and a positive integer  $n$  as arguments and returns  $x^n$ .
    - c) A function that takes a positive integer  $n$  as an argument and returns the  $n^{\text{th}}$  Fibonacci number.
  2. Using recursion write C functions for the following:
    - a) Factorial of a non-negative integer  $n$ .
    - b) Number of combinations of  $n$  things taken  $r$  at a time.
    - c) Greatest Common Divisor of two integers.
    - d) Least Common Multiple of two integers.
- 7. Unit III (Cycle 7)**
- a) Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
  - b) Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
    1. Larger of two numbers.
    2. Smaller of two numbers.
    3. Sum of the squares of two numbers.
  - c) Write a program to generate Pascal's triangle.
  - d) Write a program to count the number of letters, words, and lines in a given text.
- 8. Unit IV (Cycle 8)**
1. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
  2. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
  3. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.
- 9. Unit IV (Cycle 9)**
1. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
  2. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.
- 10. Unit V (Cycle 10)**
1. Write a function to swap two numbers.
  2. Write a function to compute area and circumference of a circle, having area and circumference as pointer arguments and radius as an ordinary argument.
- 11. Unit VI (Cycle 11)**
1. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
  2. Define a structure point. Write a program to find the distance between two points.

3. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.

**12. Unit VI (Cycle 12)**

1. Write a program to:
  - a) Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
  - b) Open the file created above and display the contents of the file.
  - c) Copy a file into some other file, file names given by the user or by command line arguments.
  - d) Append a user mentioned file to another file.
  - e) Reverse the first n characters of a file.

a	b	c	d	e	f	g	h	i	j	k	l
							X	X	X		X

**Syllabus for B. Tech I Year I semester**  
**Electrical and Electronics Engineering (EEE)**  
**ENGLISH LAB (Oral Communication Skills)**

Common to I Year I Semester (ECE, EEE and MECH) & II Semester (ECM, CSE, IT and Civil)

**Course code: 7HC62**

**L T P C**  
**0 0 2 1**

*Course Objectives: The course will develop the students' ability to*

- *integrate listening and speaking skills*
- *communicate effectively*
- *speak effectively on a given topic*
- *master the art of presentation*
- *interact with peers in a group discussion*
- *get exposed to face interviews*

*Course Outcomes: After completing the course students will be able to*

- *understand, analyze and respond to the audience by listening effectively*
- *acquire the articulation of different types of sentences by practicing pause patterns and question tags.*
- *translate and demonstrate self, participate effectively in activities like JAM, extempore*
- *express and deliver a presentation on the given topic through role plays and situational dialogues*
- *implement English language to meet the standards of corporate and real world in a group.*
- *present and communicate effectively by facing mock interviews by experts from industry and academy.*

**Unit-I :** Practice sessions on

Listen & Speak

Listen, Read, and Speak

**Unit-II:** Practice sessions on

Articulation of types of Sentences

Question Tags

Introduction and greeting

Asking for and Giving

Directions

**Unit-III:** Practice sessions on

JAM/Extempore/

Impromptu

Prepared talk on given topics

**Unit-IV:** Practice sessions on

Formal Presentation

Role Plays & Situational Dialogues

**Unit-V :** Practice sessions on

Group Discussion

**Unit-VI:** Practice sessions on

Mock Interviews

**Suggested Readings:**

- (i) *Step by step learning language and life skills* by Niruparani, Jayasree Mohanraj, Indira, Sailakshmi Pearson Publishers
- (ii) *Communication skills for technical students* by TM Farhathullah, Orient Black swan Publications
- (iii) *English for technical Communication* by K.R. Lakshmi Narayan, Scitech Publications
- (iv) *Practical English Usage*. Michael Swan. OUP. 1995.
- (v) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- (vi) *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**TECHNICAL SEMINAR -I**

**Code: 7A191**

**Course Objectives:**

**L T P C**  
**- - 2 1**

**To make the student to learn:**

- i. To have good communication skill
- ii. To have good presentation skill
- iii. To independent learning

**Course Outcomes:**

*Students are able to understand about conventional and non conventional power plants*

- i. *Students are able to understand basics of electrical protection*
- ii. *Students are able to understand about home appliances*
- iii. *Students are able to understand overview of power system*

**Topics for Technical Seminar**

1. Basic knowledge about Hydro Power Plants
2. Basic knowledge about Thermal Power Plant
3. Basic knowledge about nuclear power plant
4. Knowledge about common protection devices like Fuse, HRC Fuse, MCB.
5. Basic knowledge about solar power plant.
6. Basic knowledge about Wind mill power plant.
7. Basic working knowledge Captive Power generation and its types of sources
8. Knowledge on working principle about home applications like Fan, Wet grinder, Mixer grinder, Fluorescent Lamp, Motor pump, Refrigerator, Air conditioner.

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	<hr/> 100 marks

a	b	c	d	e	f	g	h	i	j	k	l
X					X	X					

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**CHEMISTRY  
(Common to EEE, ME, ECE)**

**Code: 7HC03**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**Course Objectives:**

1. To understand microscopic chemistry in terms of atomic and molecular orbitals
2. To learn the preparation and applications of commercial and conducting polymers and lubricant materials
3. To learn the industrial problems caused by water and municipal water treatment
4. To acquire knowledge about different types of batteries and their working mechanism
5. To develop the concepts and types of corrosion and the factors influence corrosion and to understand the control methods and protective coatings for metals
6. To learn the chemical reactions of drugs that are used in the synthesis of drug molecules

**UNIT – I: ATOMIC AND MOLECULAR STRUCTURE (6L)**

Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

**UNIT – II: ENGINEERING MATERIALS (8L)**

**Plastics** – Thermosetting and Thermoplastics, preparation, properties and engineering applications of plastics: PVC, Teflon, Bakelite. **Fibers:** Nylon 6,6 and Dacron.

**Rubbers** – natural and artificial rubber, vulcanization of natural rubber, Buna-S, Buna-N and their engineering applications.

**Lubricants**

Definition, classification and function of lubricants, Types of lubrication and mechanisms – Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants – Viscosity, flash and fire point, cloud and pour point and acid value. **Engineering applications:**

**UNIT - III: WATER TECHNOLOGY (8L)**

- (a) **Introduction:**- Hardness of water – types of hardness (temporary and permanent), calculation of hardness- Numerical problems. Estimation of hardness of water by EDTA Method.
- (b) **Water for Industrial purpose:** Food, sugar, textile, paper and pharma industries, water for steam making characteristics of boiler feed water, boiler troubles- scale and sludge & Carry over (priming & foaming), boiler corrosion, caustic embrittlement.
- (c) **Water Treatment:** Internal conditioning- phosphate, carbonate & calgon conditioning. External Treatment: Ion-exchange process. Desalination-reverse osmosis. Municipal water treatment- sedimentation, coagulation, filtration, disinfection-chlorination, ozonization. **Engineering applications: Methodology and working of mineral water plant for drinking purpose.**

**UNIT – IV: ELECTROCHEMISTRY (8L)**

Conductance – conductors (metallic and electrolytic), types of conductance – specific, equivalent and molar conductance – effect of dilution on conductance.

Free energy and emf, cell potentials, electrode potential (oxidation and reduction). Types of electrodes - redox electrode (quinhydrode electrode), metal – metal insoluble salt electrode and Ion selective electrode.

Cell notation and cell reaction –Nernst equation and applications. **Engineering Applications:**

**Batteries :** Types of batteries

- Primary batteries – Lechalanche cell (dry cell), Lithium cell
- Secondary batteries(Accumulators) – Lead acid battery, Lithium-ion battery
- Fuel cells-  $H_2 - O_2$  fuel cell and  $MeOH-O_2$  fuel cell-advantages and applications.

**Engineering applications – future water powered car, Hydrogen production and storage.**

#### UNIT - V: CORROSION AND ITS PREVENTION (7L)

Corrosion – basic concepts –types of corrosion, chemical, electrochemical corrosion (absorption of  $O_2$  and evolution of  $H_2$ ). Types of electrochemical corrosion – galvanic corrosion, pitting corrosion-factors affecting the rate of corrosion.

**Cathodic protection** – sacrificial anodic protection and impressed current cathodic protection method. Methods of metallic coatings-hot dipping (**tinning and galvanizing**), metal cladding (**Al cladding**), electroplating (**copper plating**) and electroless plating (**nickel plating**).

#### UNIT-VI: ORGANIC REACTIONS AND DRUG MOLECULES (5L)

Introduction : reactions involving substitution( $S_N1$ ,  $S_N2$ ) addition to double bond( $C=C$ ), elimination( $E^1$  and  $E^2$ ), oxidation (using  $KMnO_4$ ,  $CrO_3$ ), reduction (Hydrogenation by  $Ni/H_2$ ,  $Pd/C$ )

**Drugs :** Definition, classification structure and applications of commonly used drug molecules-paracetamol, aspirin, ibuprofen and diphenhydramine (Benadryl)

Principles of spectroscopy and selection rules: Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules-**Applications.**

#### TEXT BOOKS:

- Engineering Chemistry: by Jain & Jain ,Dhanapathrai Publications (2015)
- Engineering Chemistry: by Thirumala Chary & Laxminarayana, Scitech Publications (2016)
- Engineering Chemistry: by & B.Rama Devi, Prsanta Rath & Ch. Venkata Ramana Reddy, Cengage Publications (2016)

#### REFERENCE BOOKS:

- Fundamentals of Molecular Spectroscopy by C. N. Banwell
- Drugs by David Krupadanam- Universities Press
- University chemistry by B. H. Mahan
- Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
- Organic Chemistry: Structure and Function by K. P. C. Vollhardt and N. E. Schore, 5th Edition <http://bes.whfreeman.com/vollhardtschore5e/default.asp>

#### Course Outcomes

After completion of the course, the student will be able to:

- Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
- Identify and differentiate conductivity of polymers, thermoplastic, thermosetting plastics and various lubricants.
- Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
- Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
- Differentiate the types of corrosion and methods used to prevent the corrosion.
- Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.



a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**ELECTRICAL CIRCUITS AND NETWORKS – I**

**Code: 7A201**

**L T P C**  
**3 - - 3**

**Course Objectives :**

*To make the students to understand:*

1. The fundamentals of the basic elements and their application in electrical circuits.
2. The importance of network topology in analysis of electrical networks.
3. The basic concepts of magnetic circuits and their applications.
4. The concept of single phase circuits and their analysis.
5. The significance of resonance and its use
6. Verify the network theorem and their application in electrical networks.

**Course Outcomes:**

*After completion of the course work the student will be able to*

1. Apply Kirchhoff's laws for solving electrical circuits.
2. Draw the network graph and solve the problems of electrical networks.
3. Analyze and solve the problems of composite magnetic circuits.
4. Understand the basic concepts of single phase AC circuits and ability to solve the problems related to steady state analysis.
5. Compute for parameters like  $Q$  factor and bandwidth for resonance circuits.
6. Apply and solve the problem associated with electrical networks using network theorems

**UNIT – I: INTRODUCTION TO ELECTRICAL CIRCUITS:**

Circuit concept, R – L – C parameters, Voltage and current sources, Independent and dependent sources, Source transformation, Kirchhoff's Laws, Network reduction techniques, Series, Parallel, Series - parallel, Star – to – delta and Delta – to – star transformation, Mesh analysis, Nodal analysis, Concept of super mesh and super node. Voltage current relationship for passive elements (for different input signals – square, ramp, saw tooth, triangular)

**UNIT – II: NETWORK TOPOLOGY:**

Definitions, Graph, Tree, Basic cut-set and basic tie-set matrices for planar networks, Loop and Nodal methods of analysis of Networks using graph theory, Duality & dual networks

**UNIT – III: MAGNETIC CIRCUITS:**

Basic terms in Magnetic Circuits, Comparison between electric and magnetic circuits, Composite magnetic circuit, Analysis of series, parallel magnetic circuits, Faraday's Laws of electromagnetic induction, Concept of self and mutual inductance, Dot convention, Co-efficient of coupling.

**UNIT - IV: SINGLE PHASE A.C. CIRCUITS:**

R.M.S. and Average values, Form factor for different periodic wave forms,  $j$  Notation, Complex and polar forms of representation, Steady state analysis of R,L,C circuits (in series, parallel and series parallel combinations) with sinusoidal excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Phase angle, Concept of power factor, Real, Reactive powers and Complex power.

**UNIT – V: LOCUS DIAGRAMS & RESONANCE:**

Locus diagrams of R-L, R-C circuits with variation of various parameters (series and parallel), Resonance in series, parallel circuits, Concept of band width and  $Q$  factor.

**UNIT – VI: NETWORK THEOREMS:**

Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power transfer, Millman's and Compensation theorems with D.C. & A.C. excitations.

**TEXT BOOKS:**

1. Engineering circuit analysis - William Hayt and Jack E. Kemmerly, Tata McGraw - Hill Company, 6<sup>th</sup> edition.
2. Circuits & Networks - A. Sudhakar and Shyamamohan S. Palli, Tata Mc Graw Hill, 3<sup>rd</sup> edition.

**REFERENCES:**

1. Network Analysis - M.E. Vanvalkenberg, Printice Hall of India, 3rd edition
2. Circuit theory (Analysis & Synthesis) - A. Chakravarthy, Dhanpath Rai & Co., 6<sup>th</sup> edition.
3. Circuits & Networks – M.S. Sukhija, T.K. Nagasarkar, Oxford University Press, 2<sup>nd</sup> edition.

H: High M: Medium L: Low

a	b	c	d	e	f	g	h	i	j	k	l
H	M	M								L	

**Syllabus for B. Tech I Year I semester**  
**Electrical and Electronics Engineering (EEE)**  
**ENGINEERING MATHEMATICS -II**  
**(Common to EEE, ECE, ME, CE)**

Code: 7HC08

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

*Pre Requisites: Engineering Mathematics-I**Course Objectives: To make the students to understand and expected to learn*

1. Multiple integration and its applications also acquire knowledge on curvilinear coordinate system.
2. Various analytical methods to solve first order first degree and also the equations not of first degree ordinary differential equations.
3. Methods to solve higher order ordinary differential equations.
4. Series solution of second order ordinary differential equations with variable coefficients.
5. Basic concepts of Complex Analysis and conformal mapping and their properties.
6. Series expansion of a function using Taylor's and Laurent's series. Evaluation of definite integrals and improper integrals.

**UNIT 1: MULTIVARIABLE CALCULUS (INTEGRATION):**

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), Introduction to orthogonal curvilinear coordinates, Simple applications involving cubes; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes (without proofs).

**UNIT 2: FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS:**

Exact, linear and Bernoulli's equations; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

**UNIT 3: ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDERS:**

Higher order linear differential equations with constant coefficients, method of variation of parameters, Cauchy-Euler equation;

**UNIT 4: SERIES SOLUTIONS TO SECOND ORDER ORDINARY DIFFERENTIAL EQUATIONS:**

Power series solutions: Legendre polynomials, Bessel functions of the first kind and their properties.

**UNIT 5: COMPLEX VARIABLE – DIFFERENTIATION:**

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

**UNIT 6: COMPLEX VARIABLE – INTEGRATION:**

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

**TEXT BOOKS:**

- (i) R K Jain and S R K Iyengar *Advanced Engineering Mathematics*, Narosa Publications.
- (ii) Ramana B.V., *Higher Engineering Mathematics*, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.

**REFERENCE BOOKS:**

- (i) Erwin kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
- (ii) N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, Reprint, 2008.
- (iii) B.S. Grewal, *Elementary Engineering Mathematics*, Khanna Publishers
- (iv) *Engineering Mathematics*, Srimanta Pal, OXFORD university press.
- (v) G.B. Thomas and R.L. Finney, *Calculus and Analytic geometry*, 9th Edition, Pearson, Reprint, 2002.
- (vi) Veerarajan T., *Engineering Mathematics for first year*, Tata McGraw-Hill, New Delhi, 2008.
- (vii) *Engineering Mathematics*, P. Sivaramakrishna Das, Pearson Publications.

**Course Outcomes:** After the course completion the students will be able to

1. Solve the problems of multiple integration and apply these concepts for finding the parameters like surface area, volume, center of mass and centre of gravity.
2. Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay.
3. Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in LCR circuits.
4. Write the solutions of Legendre and Bessel's equations series.
5. Understand the concept of analyticity of a function; solve the problems on conformal mapping.
6. Express the functions of a complex variable in series form also able to evaluate definite and improper integrals using complex integration.

1	2	3	4	5	6	7	8	9	10	11	12
H											M

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**WORKSHOP/MANUFACTURING PRACTICES (THEORY)  
Common to I year I sem (CSE, IT & CE) II sem (EEE, ECE & ME)**

**Code: 7BC01**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	0	0	1

**Course Objectives:**

*Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.*

**Course Outcomes:**

- 1) To understand various basic tools to perform simple joints using metal and wood.
- 2) To understand the principle of various electrical and electronic appliances and their applications.
- 3) To understand the manufacturing process of welding, casting and tin smithy and their applications.
- 4) To understand the operation of basic as well as advanced machines used for fabrication of Metals, Plastics and Glass.

**I: Theory:** In theory classes the following syllabus is to be covered in 10hrs using PPTS and Videos (Elementary treatment only)

1. Fitting & Power Tools
2. Electrical & Electronics Appliances
3. Carpentry
4. Plastic molding & Glass Cutting
5. Metal Casting
6. Metal Joining: Arc & gas welding and brazing
7. Metal forming
8. Machining
9. Advanced manufacturing methods: (Micro machining, USM,ECM,EDM )
10. CNC machining & Additive Manufacturing

**Suggested Text/Reference Books:**

- (1) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., “Elements of Workshop Technology”, Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- (2) Rao P.N., “Manufacturing Technology”, Vol. I and Vol. II, Tata McGrawHill House, 2017.

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**CHEMISTRY LABORATORY**

**Code: 7HC63**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**Course Objectives:**

*The student will be able to learn:*

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification /acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf ( $\text{FeSO}_4$  Vs  $\text{KMNO}_4$  / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetate
10. Synthesis of a polymer- Thiakol rubber / Urea-Formaldehyde resin
11. Synthesis of a drug- Aspirin
12. Thin layer chromatography

**List of Experiments**

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification/acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf ( $\text{FeSO}_4$  Vs  $\text{KMNO}_4$  / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetate
10. Synthesis of a polymer- Thiakol rubber / Urea-Formaldehyde resin
11. Synthesis of a drug- Aspirin
12. Thin layer chromatography

**Course Outcomes**

*After completion of the course, the student will be able to learn:*

1. Methods to prepare inorganic complexes.
2. The process to determine surface tension of different liquids using stagnometer
3. The process to determine viscosity of lubricants by using redwood viscometer.
4. How to find acid value of an oil.
5. The principle and determination of Hardness of a water sample.
6. The methods to estimate amount of chlorine in water.
7. To determine unknown concentration of acid by using conductometric method.
8. To determine unknown concentration of acid by using potentiometric method.
9. Estimate rate constants of reactions from concentration of reactants/products as a function of time.
10. Methods to prepare industrially important polymers.
11. The method of preparation for organic compounds.
12. To separate the organic compounds from their mixture by using Thin layer chromatography.

a	b	c	d	e	f	g	h	i	j	k	l
x		x							x		

**Syllabus for B. Tech I Year I semester**  
**Electrical and Electronics Engineering (EEE)**  
**ELECTRICAL CIRCUITS AND NETWORKS ANALYSIS LAB**  
**Common to (ECE I Year I Sem) (EEE & ECM I Year II Sem)**

**Code: 7AC61**

**L T P/D C**  
**- - 2 1**

**Course Objectives:**

**To make the student to learn:**

- i. Verification of network theorems experimentally.
- ii. To measure frequency of RLC series and parallel circuits under resonance
- iii. To determine self & mutual inductance and co-efficient of coupling for coupled circuits
- iv. The construction of current locus diagram for a given parallel circuit.
- v. Simulation for analysis of electrical networks
- vi. Method for determining the parameters of a coil

**Course Outcomes:**

**At the end of the course, students will be able to**

- i. Perform the test for verification of various network theorems
- ii. Measure the frequency for a RLC series/parallel circuits under resonance.
- iii. Conduct an experiment for determination of self & mutual inductance and coefficient of coupling
- iv. Construct current locus diagram by performing a test on single phase parallel circuits
- v. Simulate for analysis of electrical circuits.
- vi. Determine the parameters of the coil

**List of Experiments (ANY 10 Experiments to be conducted)**

1. Verification Thevenin's Theorem and Norton's Theorem
2. Verification of Maximum Power Transfer Theorem
3. Verification of Superposition Theorem
4. Verification of Compensation Theorem
5. Verification of Reciprocity Theorem and Millmann's Theorem
6. Finding resonant frequency in Series and Parallel circuits
7. Determination of Self Inductance, Mutual Inductance and Coefficient of coupling
8. Calculation of Z and Y Parameters
9. Construction of current locus diagram for RL and RC circuit
10. Mesh and Nodal Analysis by simulation
11. Determination of Average value and RMS value of a complex wave
12. Determination of parameters of a coil.
13. Determination of Time constant of RL and RC series circuit.

a	b	c	d	e	f	g	h	i	j	k	l
							X	X	X		X

**Syllabus for B. Tech I Year I semester**  
**Electrical and Electronics Engineering (EEE)**  
**ENGLISH - Reading, Listening and Writing**  
**Common to I Year I Semester (ECM, CSE, IT and Civil) & II Semester (ECE, EEE and MECH)**

**Code: 7HC01****L T P C**  
**1 0 0 1**

**Course Objectives** : *The students will*

- *acquire knowledge on various types of listening techniques, barriers and benefits of listening*
- *recognize the speech sounds and learn the intonation patterns*
- *learn various vocabulary patterns*
- *develop the ability to structure and punctuate the sentences*
- *learn different reading techniques*
- *learn different writing skills*

**Course Outcomes** : *At the end of the course the students will be able to*

- *understand and differentiate different types of listening techniques used to interact with real world problems*
- *differentiate the speech sounds and improve their accent and modulation while speaking*
- *understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections*
- *discriminate a variety of sentence types, their structure and use punctuations*
- *get acclimatized to reading strategies and note making.*
- *develop proficiency in writing and preparing resume*

**Unit-I : Listening**

- 1.1 Importance of Listening;
- 1.2 Types of listening
- 1.3 Barriers to Listening
- 1.4 Benefits of Listening

**Unit-II: Basic Communication Skills**

- 2.1 Introduction to Speech Sounds
- 2.2 Vowels, Diphthongs, Consonant Sounds
- 2.3 Significance of word accent
- 2.4. Intonation Patterns

**Unit-III: Vocabulary**

- 3.1 Word Roots - Affixes: Prefixes and Suffixes
- 3.2 Homophones, Homonyms, Homographs
- 3.3 Synonyms – Antonyms
- 3.4 One word substitutes
- 3.5 Idioms and Phrases

**Unit-IV: Basic Writing Skills**

- 4.1 Sentence Structure
- 4.2 Kinds of Sentences
- 4.3 Punctuation in Writing

**Unit-V : Reading Comprehension**

- 5.1 Skimming and Scanning
- 5.2 Prediction Techniques and Inferring
- 5.3 Note Making
- 5.4 Reading Comprehension



**Unit-VI: Writing Skills**

- 6.1 Paragraph Writing
- 6.2 Paraphrasing
- 6.3 Letter Writing
- 6.4 Resume Writing

**Suggested Readings:**

- (i) *English grammar just for you* Rajeevan Karal, Oxford publications
- (ii) *Practical English Usage*. Michael Swan. OUP. 1995.
- (iii) *Remedial English Grammar*. F.T. Wood. Macmillan.2007
- (iv) *On Writing Well*. William Zinsser. Harper Resource Book. 2001
- (v) *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- (vi) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- (vii) *Learn to Write* by Dr. G. Varalakshmi, Kindle Edition 2016
- (viii) *A practical course for developing writing skills in English* by J.K. Gangal, PHI Learning Pvt Ltd.

1	2	3	4	5	6	7	8	9	10	11	12
H											M

**Syllabus for B. Tech I Year I semester**  
**Electrical and Electronics Engineering (EEE)**  
**WORKSHOP/MANUFACTURING PRACTICES (LAB)**

**B.Tech I year I sem (CSE, ECM, IT & CE) II sem (EEE, ECE & ME)**

**Code: 7BC61**

**L T P C**  
0 0 3 1.5

**Course Objectives:**

- 1) To identify various basic tools to perform simple joints using metal and wood.
- 2) To recognize various electrical and electronic and their applications.
- 3) To understand the manufacturing process of welding, casting and tinsmith and apply the processes in making simple products.
- 4) To understand and operate basic machines for fabrication of Metals, Plastics and Glass.
- 5) To understand the functions and parts of commonly used domestic appliances.

**Course outcomes:**

1. After completion of the course, the student will be able to **fabricate** components with their own hands.
2. Assemble different components and produce small devices of their interest.

**Work shop and Manufacturing Practices**

Minimum of 10 experiments out of twelve given here under is to be completed

S.No	Trades	List of Experiments
1	Fitting Shop	1. Preparation of T-Shape Work piece 2. Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
2	Carpentry	3. Practice of Cross Half lap joint 4. Practice of Half lap Dovetail joint
3	Electrical & Electronics	5. One lamp one switch Practice 6. Stair case wiring: Practice
4	Welding shop ( Arc & Gas)	Demonstration of Gas and Resistance welding 7. Practice of Lap and Butt joint using Arc welding
5	Casting	8. Preparation of mould by using split pattern 9. Mould preparation and pouring of molten metal.
6	Tin Smithy	10. Preparation of Rectangular Tray & Square box
7	Machine Shop	11. Demonstration of turning, Drilling and Reaming operations
8	Plastic molding & Glass Cutting	12 a) Demonstration of Injection Moulding b) Demonstration of Glass Cutting with hand tools
9	Domestic Appliances	13. Demonstration of Electric Iron, fan, Mixer, Hair Drier, Washing Machine etc.
10	Lab project	14. Making various components and / or assembling the components which can be useful in domestic / engineering applications

a	b	c	d	e	f	g	h	i	j	k	l
							X	X	X		X

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**ENGLISH LAB (Reading, Listening and Writing)**

Common to I Year I Semester (ECM, CSE, IT and Civil) & II Semester (ECE, EEE and MECH)

**Code: 7HC61**

**L T P C**

**0 0 2 1**

**Course Objectives** : The students will

- acquire knowledge on various types of listening techniques, barriers and benefits of listening
- recognize the speech sounds and learn the intonation patterns
- learn various vocabulary patterns
- develop the ability to structure and punctuate the sentences
- learn different reading techniques
- learn different writing skills

**Course Outcomes** : At the end of the course the students will be able to

- understand and differentiate different types of listening techniques used to interact with real world problems
- differentiate the speech sounds and improve their accent and modulation while speaking
- understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections
- discriminate a variety of sentence types, their structure and use punctuations
- get acclimatized to reading strategies and note making.
- develop proficiency in writing and preparing resume

**Unit-I :** Practice sessions on

- Listening for Basic Vocabulary
- Listening for General Information
- Listen for specific information
- Listening Comprehension

**Unit-II:** Practice sessions on Pronunciation

- Articulation of Vowel and Consonant sounds
- Listening for Word accent
- Intonation Patterns

**Unit-III:** Exercises on Word Roots

- Affixes: Prefixes and Suffixes
- Identifying Homophones,
- Homonyms, Homographs
- Synonyms - Antonyms
- One word substitutes
- Idioms and Phrases

**Unit-IV:** Exercises on

- Punctuation and Spelling
- Error Identification in Sentences
- Conversion of Sentences

**Unit-V :** Practice sessions on

- Using passages for skimming and scanning
- Note Making using Texts
- Reading Comprehension using different techniques

**Unit-VI:** Exercises on

- Paragraph Writing using hints/Guided Paragraphs
- Writing Letters
- Writing Resume

**Suggested Readings:**

- (i) *English grammar just for you* Rajeevan Karal, Oxford publications
- (ii) *Practical English Usage*. Michael Swan. OUP. 1995.
- (iii) *Remedial English Grammar*. F.T. Wood. Macmillan.2007
- (iv) *On Writing Well*. William Zinsser. Harper Resource Book. 2001
- (v) *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- (vi) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- (vii) *Learn to Write* by Dr. G. Varalakshmi, Kindle Edition 2016
- (viii) *A practical course for developing writing skills in English* by J.K. Gangal, PHI Learning Pvt Ltd.

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

**Syllabus for B. Tech I Year I semester  
Electrical and Electronics Engineering (EEE)**

**Technical Seminar -II**

**Code: 7A292**

**L T P C**  
- - 2 1

**Course Objectives:**

**To make the student to learn:**

- i. To have good communication skill
- ii. To have good presentation skill
- iii. To independent learning

**Course Outcomes:**

*Students are able to understand about conventional and non conventional power plants*

- i. Students are able to understand basics of electrical protection
- ii. Students are able to understand about home appliances
- iii. Students are able to understand overview of power system

**Topics for Technical Seminar**

1. Overview of electrical Power generation and consumption scenario in Telangana state, India and world.
2. Working principle and operation of earthing / grounding with types
3. Different types of losses in generation, transmission and distribution electrical power system
4. Overview of power system and Electro Magnetic Field effect on power system.
5. Applications of different types of motors in electric vehicles
6. Overview of solar power generation in India
7. Overview of Wind power generation
8. Overview of HVDC transmission in India

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week)	: 10 marks
End semester Viva	: 20 marks
<b>Total</b>	<b>100 marks</b>

a	b	c	d	e	f	g	h	i	j	k	l
H	M	M								L	

**II Year B.Tech I Semester**  
**TRANSFORM TECHNIQUES AND NUMERICAL METHODS**  
**(Common to ECE & EEE)**

**Code:** 7HC13

**Pre Requisites:** Engineering Mathematics – II

**L T P/D C**  
**2 0 0 2**

**Objectives:** *The students are expected to learn*

- *Concept, properties of Laplace transforms*
- *Solving ordinary differential equations using Laplace transforms techniques.*
- *Various methods to the find roots of an equation.*
- *Concept, properties of Z-Transforms, Solving Difference equations using Z-Transforms.*
- *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
- *Applications of PDE.*
- *Concept of finite differences and to estimate the value for the given data using interpolation.*
- *Evaluation of integrals using numerical techniques*
- *Solving ordinary differential equations using numerical techniques.*

**UNIT - I: LAPLACE TRANSFORMATIONS:**

Laplace transform of standard functions, shifting theorems, change of scale property, Laplace Transform of Derivatives and Integrals, Multiplication by powers of 't', Division by 't' (without proofs). Laplace transform of unit step function, Impulse function. Inverse Laplace transforms: properties, partial fraction method and convolution theorem (without proof). Solving ordinary differential equations with constant coefficients using Laplace Transforms.

**UNIT - II: Z- TRANSFORMS:**

Z- Transforms and Inverse Z-transforms, properties, damping rule, Shifting properties, Initial and final value theorems Convolution theorem (without proofs).  
*Applications-Solution of difference equation by Z- transforms*

**UNIT- III: PARTIAL DIFFERENTIAL EQUATIONS:**

Formation of Partial Differential Equations by Elimination of Arbitrary Constants and Arbitrary Functions. Solutions to First order Linear and Non-linear Equations-Standard Forms, Equations Reducible to Standard Forms. Classification of partial differential equations. Method of Separation of Variables, Solution of One dimensional Heat Equation.

**UNIT- IV: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS AND NUMERICAL INTEGRATION:**

The Bisection Method – The Method of False Position –Fixed point iteration Method – Newton-Raphson Method. Newton-Cotes Quadrature Formula, Trapezoidal rule – Simpson's 1/3 rule – Simpson's 3/8 rule.

**UNIT - V: INTERPOLATION:**

Introduction– Finite differences- Forward Differences, Backward differences, Central differences. Newton's formulae for interpolation – Gauss Central Difference Formulae (without proofs), Lagrange's Interpolation formula for unevenly spaced points.

**UNIT – VI: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:**

Solution by Taylor's series – Picard's Method of successive Approximations – Euler's Method – Runge-Kutta Methods of fourth order, Predictor-Corrector Methods-Milne's Method.

**TEXT BOOKS:**

1. R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
3. S. S. Sastry, Introductory methods of numerical analysis. PHI, 4<sup>th</sup> Edition, 2005.

**REFERENCE BOOKS:**

1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.
2. Engineering Mathematics, Srimanta Pal, OXFORD university press.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
4. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

*Course outcomes: After learning the contents of this paper the student must be able to*

- *Use the Laplace transforms techniques for solving ODE's*
- *Use the Z-Transforms technique for solving Difference equations*
- *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
- *Find the root of a given equation.*
- *Estimate the value for the given data using interpolation*
- *Find the numerical solutions for a given ODE's*

1	2	3	4	5	6	7	8	9	10	11	12
H	H	M						M			L

H: High M: Medium L: Low

**Syllabus for B. Tech (E.E.E.) II Year I semester  
DIGITAL LOGIC DESIGN**

(Common to ECE/ECM/EEE)

CODE: 7C302

L T P/D C  
2 1 - 3

**COURSE OBJECTIVES:** To learn the different numbering systems, Boolean functions and design of Combinational and Sequential Circuits.

**COURSE OUTCOMES:**

After completing this course, the students will have demonstrated

- i. an ability to understand number systems and apply the rules of Boolean algebra to simplify Boolean expressions.
- ii. an ability to simplify of Boolean expressions using K-map.
- iii. an ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.
- iv. an ability to design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers
- v. an ability to design digital design using PLD's such as ROM's, PLA's, PAL s.
- vi. an ability to design digital controllers using Algorithmic State Machine Charts .

**Mapping of Course Outcomes with Program Outcomes**

	a	b	c	d	e	f	g	h	i	j	k	L	m
CO1	3	2	2	2								2	3
CO2	3	2	2	2								2	3
CO3	3	2	2	2								2	3
CO4	3	2	2	2								2	3
CO5	3	2	2	2								2	3
CO6	3	2	2	2								2	3

**UNIT – I NUMBER SYSTEM:**

Binary, decimal, octal, hexa decimal, weighted and un-weighted codes.

**Boolean Algebra:** Axiomatic definition of Boolean algebra, Binary operators, postulates of and theorems. Boolean addition, subtraction, 1's complement, 2's complement. Switching functions, Canonical forms and Standard forms, Simplification of switching functions using theorems.

**UNIT – II LOGIC GATES:**

Basic gates and universal gates.

**Minimization of Switching Functions:** simplification rules, Karnaugh map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Quine-McCluskey Tabular Method, Prime Implicant chart.

*Application: Design of a Basic Calculator Using Logic Gates.*



### **UNIT – III COMBINATIONAL LOGIC DESIGN:**

Single output and multiple output combinational logic circuit design, AND-OR, OR-AND, and NAND/NOR realizations, Exclusive-OR and Equivalence functions, Binary adders/subtractors, Encoder, Decoder, Multiplexer, Demultiplexer, MUX realization of switching functions, Parity bit generator, Code-converters, Concepts of threshold logic and threshold gates.

*Applications: Application of Decoder in Seven Segment Display, application of Encoders in Servomotors.*

### **UNIT - IV SEQUENTIAL CIRCUITS-1:**

Classification of sequential circuits (Synchronous, Asynchronous Pulse mode, and Level mode with examples). Basic flip-flops-Triggering and excitation tables. Conversion of flip-flops.

*Applications: Application of SR Flip Flop in Switch Debounce Circuit.*

### **UNIT – V SEQUENTIAL CIRCUITS-2:**

The sequential circuit model, Asynchronous counters, Design of simple synchronous sequential circuits such as counters (Design of modulo-N counter, Ring counter, twisted ring counter) and Shift registers

*Applications: Design of 1010 sequence detector, Design of Digital Clock using Counters*

### **UNIT – VI PROGRAMMABLE LOGIC DEVICES:**

Basic PLD's-ROM, PROM, PLA, and PLD Realization of Switching functions using PLDs. Algorithmic State Machines: State machines and state diagrams.

*Applications: Design of a Weighing machine and Binary multiplier.*

### **TEXT BOOKS:**

1. Morris Mano-,Digital design –PHI, 2nd Edition.
2. ZviKohavi and Niraj K Jha -Switching & Finite Automata theory – Cambridge, 3rd Edition.
3. SubrataGhoshal, Digital Electronics,2012, Cengage Learning

### **REFERENCES:**

- 1.Fletcher -An Engineering Approach to Digital Design – PHI.
- 2.Fundamentals of Logic Design, Roth, Kenny, Seventh Edition, Cengage Learning
- 3.R.P.Jain-Switching Theory and Logic Design- TMH Edition,2003.
- 4.John M. Yarbrough -Digital Logic Applications and Design – Thomson Publications, 2006
- 5.CVS Rao -Switching Theory and Logic Design –Pearson Education, 2005

1	2	3	4	5	6	7	8	9	10	11	12
M	H	M	H	M							L
H: High			M: Medium			L: Low					

**Syllabus for B. Tech (E.E.E.) II Year I semester**

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>

Code: 7C301

**ELECTRONIC DEVICES AND CIRCUITS**

(Common to ECE/EEE/ECM)

**Course Objectives:**

The objective of this course is to provide the learners with a comprehensive understanding of electronic devices, circuits and their applications.

**Course Outcomes:**

After studying this course, the students will be able to

1. Learning the operation of diode and its application as rectifier and filters
2. Understand the Fundamentals of BJT operation, Characteristics, different biasing circuits, analysis of BJT amplifiers.
3. Analyze and Design of BJT Single stage, multistage amplifiers at low and high frequencies.
4. Analysis of small signal model of FET and frequency response
5. Design different types of Feedback Amplifier, Oscillators and their analysis
6. Understand the Basic regulator circuits and voltage multipliers.

**Mapping of Course Outcomes with Program Outcomes**

	a	b	c	d	e	f	g	h	i	j	k	l	m
CO1	3	2	2	2								2	3
CO2	3	2	2	2								2	3
CO3	3	2	2	2								2	3
CO4	3	2	2	2								2	3
CO5	3	2	2	2								2	3
CO6	3	2	2	2								2	3

**UNIT-I PN JUNCTION DIODE:**

P-N junction diode under forward & reverse bias. Transition capacitance and Diffusion capacitance. Break down of junctions (Avalanche and Zener Break down). Zener Diode Characteristics.

Applications: Half wave Rectifier, Full wave Rectifier, Bridge Rectifier: Analysis. Problems based on rectifiers. Introduction to power supply filters.(L,C and  $\pi$  filters )

**UNIT- II BIPOLAR JUNCTION TRANSISTOR:**

Fundamentals of BJT& Operation, Minority carrier profiles. I/P and O/P Characteristics CB, CE and CC configurations. Transistor as a switch. Switching characteristics (Rise time, Fall time, Delay Time and Storage time), Design of transistor as switch. Problems on transistor switch. BJT Biasing Methods & Stabilization. - Fixed Bias, Collector to Base Bias, Voltage Divider Bias and Problems, Concept of Thermal runaway in BJTs.

**UNIT-III SMALL SIGNAL & HIGH FREQUENCY ANALYSIS OF BJT:**

Small signal Model of BJT, h-parameter representation – Exact analysis of .CE Amplifier-. Approximate analysis of CE, CB and CC Amplifiers.

BJT hybrid  $\pi$  model. – relationship between high frequency parameters and h- parameters,  $\beta$  cut off Frequency (common Emitter short circuit Current gain), Millers Theorem, Concept of Multistage amplifier - N-stage cascaded amplifier, equivalent circuits, Darlington pair( high input resistance transistor circuits), Cascode (CE+CB) amplifier, Frequency response of single & two stage RC coupled Amplifier, Analysis at Low and High frequencies.

#### **UNIT-IV FIELD EFFECT TRANSISTOR:**

Construction & Working of JFET, JFET characteristics, FET Parameters, Construction & Working of MOSFET, MOSFET characteristics, (Enhancement and depletion mode); Comparison of JFET & MOSFET

Biasing of JFET - Self bias and fixed bias. Small signal Analysis of common source, common drain and common gate amplifier configurations

#### **UNIT- V FEED BACK AMPLIFIERS**

Fundamentals-classification- Characteristics of feedback Amplifier effect of feedback in voltage series, voltage shunt, current series and current shunt amplifiers. Problems

#### **OSCILLATORS**

Classification of Oscillators. Condition for Oscillations. RC Phase shift Oscillator, Wein bridge oscillator- Hartley oscillator, Colpitts oscillator, Quartz crystal Oscillator,

#### **UNIT-VI VOLTAGE REGULATORS:**

Classification of Voltage Regulators - Basic regulator circuit: Zener, Transistor Based: Shunt and Series Voltage regulators. Protection Circuits: Current limiting, Short circuit protection. Specifications of Voltage regulator, Voltage multipliers. Switching Regulators – (boost up, step down (buck) & Flyback)

#### **TEXT BOOKS:**

1. Electronic Devices and Circuits-J.Millman, C.C.Halkias and satyabratha jit Tata McGraw Hill,2 Ed. 2007
2. Electronic Devices AND Circuits-R.L.Boylestad & Louis Nashelsky, Pearson/Prentice Hall, 9th edition, 2006.
3. Electronic devices and Circuit Theory-Robert L. Boylestead, Louis Nashelsky, 9th ed., 2008, PE
4. Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972

#### **REFERENCES:**

1. Electronic circuit analysis-K.Lal Kishore,2004,BSP
2. 2.Electronic Devices and Circuits – K.LalKishore, 2 ed., 2005, BSP
3. 3.Electronic Devices: Systems and Applications – Robert Diffenderter, 2nd Indian Reprint., 2010, Cengage Learning
4. Electronic Devices and Circuits by Sanjeev Gupta,Dhapat Rai Publications.
5. Electronic Devices and Circuits by S.Salivahanan and N.Suresh Kumar, Tata Mc Graw Hill Publications
6. Electronic Circuits and Applications, Muhammad H Rashid, Cengage Learning

1	2	3	4	5	6	7	8	9	10	11	12
H	M			L							L
H: High			M: Medium			L: Low					

**Syllabus for B. Tech (E.E.E.) II Year I semester**  
**Electrical and Electronics Engineering**  
**ELECTRO MAGNETIC FIELDS**

Code: 7A302

**L      T      P/D      C**  
**4      --      --      4**

**Course Objective:** Students learn about fundamental concepts of static and dynamic electric fields.

**Course Outcomes:**

1. Understand the Principle of electrostatics.
2. Understand the principle of dipole and field due to dipole.
3. Understand the Fundamentals of dielectrics and calculation of capacitance.
4. Understand the Fundamentals of Ampere circuital law and force in magnetic field.
5. Understand the magnetic dipole and magnetic potential.
6. Understand the self and mutual inductance and time varying fields.

**UNIT – I ELECTROSTATICS:**

Coordinate systems-Cartesian, Spherical and Cylindrical coordinate systems- Conversion of coordinates to other systems.

Electrostatic Fields – Coulomb’s Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Guass’s law – Application of Guass’s Law – Maxwell’s first law,  $\text{div} ( D ) = \rho_v$ -Laplace’s and Poisson’s equations.

**UNIT – II ELECTRIC DIPOLE & CONDUCTORS:**

Electric dipole –Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field, Energy stored and energy density in a static electric field.

Behavior of conductors in an electric field, Conductors and Insulators, Current density – conduction and Convection current densities – Ohm’s law in point form – Equation of continuity.

**UNIT – III DIELECTRICS, CAPACITANCE & MAGNETO STATICS:**

Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics.

Static magnetic fields – Biot-Savart’s law – Oesterd’s experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell’s second Equation,  $\text{div}(B)=0$ -

**UNIT – IV AMPERE’S CIRCUITAL LAW & FORCE IN MAGNETIC FIELDS:**

Ampere’s circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere’s circuital law – Maxwell’s third equation,  $\text{Curl } (H)=J_c$ , Field due to a circular loop, rectangular and square loops.

Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors –

**UNIT – V MAGNETIC DIPOLE & MAGNETIC POTENTIAL:**

Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field.

Scalar Magnetic potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson’s equations.

**UNIT – VI SELF & MUTUAL INDUCTANCE AND TIME VARYING FIELDS:**

Self and Mutual inductance – Neumann’s formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

Time varying fields – Faraday’s laws of electromagnetic induction – Its integral and point forms – Maxwell’s fourth equation,  $\text{Curl } (E)=-\partial B/\partial t$  – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell’s equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

**TEXT BOOKS:**

1. Engineering Electromagnetism - William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7<sup>th</sup> Edition.2006.
2. Electro magnetic Fields - Sadiku, Oxford Publications

**REFERENCES:**

1. “Introduction to Electro Dynamics” - D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition
2. “Electromagnetics” - J P Tewari.
3. “Electromagnetics” - J. D Kraus Mc Graw-Hill Inc. 4<sup>th</sup> edition 1992.
4. “Electromagnetic fields”, S. Kamakshaiiah, Right Publishers, 2007.

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H: High                  M: Medium                  L: Low

	<b>II Year I semester</b>			
	<b>Electrical and Electronics Engineering</b>			
<b>Code: 7A303</b>	<b>ELECTRICAL MACHINES – I</b>			
	<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
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**Course Objective:** Students learn about fundamental concepts of DC machines and their applications.

**Course Outcomes:**

1. Understand the constructional features & Principle of operation of DC machine.
2. Understand the characteristic features of DC machines.
3. Understand the starting & speed control techniques of various types of DC motors.
4. Analyze the various testing procedures of DC machines.
5. Understand the various applications of DC machines.

**UNIT – I D.C. GENERATORS – CONSTRUCTION & OPERATION:**

D.C. Generators, Principle of operation, Action of commutator, Constructional features, Armature windings, Lap and wave windings, Simplex and multiplex windings, Use of laminated armature, E. M.F Equation, Problems.

**UNIT – II ARMATURE REACTION IN D.C. GENERATOR:**

Armature reaction, Cross magnetizing and de-magnetizing AT/pole, compensating winding, Commutation reactance voltage, Methods of improving commutation, Simple Problems.

**UNIT – III TYPES OF D.C GENERATORS:**

Methods of Excitation, Separately excited and self excited generators, Build-up of E.M.F, Critical field resistance and critical speed, Causes for failure to self excite and remedial measures, Problems.

**UNIT –IV LOAD CHARACTERISTICS OF GENERATORS:**

Load characteristics of shunt, Series and compound generators, Parallel operation of d.c shunt and series generators, Load sharing, Problems.

**UNIT – V D.C. MOTORS AND SPEED CONTROL METHODS:**

D.C Motors, Principle of operation, Back E.M.F, Torque equation, Characteristics and application of shunt, Series and compound motors, Speed control of d.c. Motors: Armature voltage and field flux control methods. Ward-Leonard system, Principle of 3 point and 4 point starters, Protective devices, Problems.

**UNIT – VI TESTING OF D.C. MACHINES:**

Losses in a D.C. Machines, Calculation of efficiency, Condition for maximum efficiency, Methods of Testing, brake test, Swinburne's test, Hopkinson's test and Field's test, Problems.

**TEXT BOOKS:**

1. Electric Machinery – A. E. Fitzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies, 5<sup>th</sup> edition.
2. Electrical Machines – P.S. Bimbra, Khanna Publishers.

**REFERENCES:**

1. Performance and Design of D.C Machines – Clayton & Hancock, BPB Publishers.
2. Electrical Machines -S.K. Battacharya.
3. Electric Machines - I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers, 3<sup>rd</sup> edition, 2004.

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H	M										L

H: High                      M: Medium                      L: Low

### II Year I semester

#### Electrical and Electronics Engineering CIRCUITS and NETWORKS- II

Code: 7A304

L      T      P/D      C  
3      -      -      3

**Course Objective:** Students learn about fundamental concepts of electrical engineering.

#### Course Outcomes:

1. Understand the three phase circuits.
2. Understand the DC and AC transients.
3. Understand the network functions.
4. Analyze the network parameters.
5. Understand the different types of filters.
6. Understand the Fourier analysis of AC circuits.

#### UNIT – I: THREE PHASE CIRCUITS:

Phase sequence, Star and delta connection, Relation between line and phase voltages and currents in balanced system, Analysis of balanced and unbalanced 3 phase circuits, Measurement of  $3\Phi$  active power by two watt meter method and reactive power by one watt meter method.

#### UNIT – II: D.C AND A.C. TRANSIENT ANALYSIS:

Transient response of R- L, R-C, R-L-C circuits (Series and parallel combination) for D.C. excitation, Initial conditions, Solution method using differential equation and Laplace transforms. Transient response of R- L, R-C, R-L-C circuits (Series and parallel combination) for sinusoidal excitations, Initial conditions, Solution method using differential equation and Laplace transforms.

#### UNIT – III: NETWORK FUNCTIONS:

The concept of complex frequency, Physical interpretation of complex frequency, Transform impedance and transform circuits, Series and parallel combination of elements, Terminal pairs or ports, Network functions for the one port and two-port, Poles and zeros of network functions, Significance of poles and zeros, Properties of driving point functions, Properties of transfer Functions, Necessary conditions for driving point functions, Necessary conditions for transfer functions, Time domain response from pole zero plot.

#### UNIT – IV: NETWORK PARAMETERS:

Two port network parameters, Z, Y, ABCD and hybrid parameters and their relations, Series, parallel and cascaded networks, Concept of transformed network, 2 port network parameters using transformed variables.

#### UNIT – V: FILTERS:

Classification of filters, Filter networks, Characteristic impedance in the pass and stop bands, Constant k and m – derived T – Section filters (Low pass, High pass, Band pass and Band stop), illustrative problems.



**UNIT – VI: FOURIER ANALYSIS OF A.C. CIRCUITS:**

The Fourier theorem, Consideration of symmetry, Exponential form of Fourier series, Line spectra and phase angle spectra, Fourier integrals and Fourier transforms, Properties of Fourier transforms.

**TEXT BOOKS:**

1. Circuit theory (Analysis & Synthesis) - A.Chakravarthy, Dhanpath Rai & Co., 6<sup>th</sup> edition.
2. Circuits & Networks (Analysis, Design & Synthesis) – M.S. Sukhija, T.K. Nagasarkar, Oxford University Press, 2<sup>nd</sup> edition.

**REFERENCES:**

1. Engineering circuit analysis - William Hayt and Jack E.Kemmerly, Tata McGraw - Hill Company, 6<sup>th</sup> edition.
2. Circuits & Networks - A.Sudhakar and Shyamamohan S.Palli, Tata McGraw – Hill, 3<sup>rd</sup> edition.

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H		M									L
H: High			M: Medium				L: Low				

**B. Tech. II Year I semester****Electrical and Electronics Engineering**

Code: 7BC04

**ELEMENTS of MECHANICAL ENGINEERING**

(Common to All Branches except Mechanical Engineering)

L	T	P/D	C
2	--	--	2

**Course Objectives:**

*The main objective of the course is to offer the students fundamental knowledge of First Law of Thermodynamics. Working of SI and CI engines, working principle of different types of Turbines & pumps. properties of material and engineering application. Working principles of various types of power transmission systems*

**COURSE OUTCOMES:**

At the end of basic mechanical engineering a student should be able to

1. To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
2. To acquire the knowledge two and four stroke engines, the function of components used in the steam power plant
3. To identify & understand the function of components used in VCR & VAR system, & about the working of hydraulic pumps & hydraulic turbines.
4. To identify & understand *properties of material and engineering application*
5. To acquire the knowledge *of various types of power transmission systems*
6. To acquire the knowledge the different NC and CNC machine.

**UNIT – I: Energy Resources and Conversion:**

Basic concepts of Thermodynamics – general classification of heat engines, Property and state, System, Boundary and surroundings, Zeroth Law, First Law of Thermodynamics and its applications- Joule’s experiment, reversible non-flow processes-Constant volume, constant pressure, constant temperature process, polytropic process, Second Law of Thermodynamics – Statements, Heat engines, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

**UNIT-II: Internal combustion engines:**

Internal combustion engines, definition, classification, components, working of four stroke cycle engines, SI and CI Engines, Performance parameters, Need for cooling, and lubrication of IC engines.

**Steam Power plant, Boiler, Steam Turbines:** Layout of steam power plant, Water tube and Fire tube Boilers: - Simple cross-tube boiler, Cochran, Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & La-mount only).

**UNIT- III:**

- a) **Hydraulic pumps & turbines:-** Centrifugal Pumps, Pelton wheel, Francis turbine and Kaplan Turbine -- Layout of Hydro electric power plant
- b) **Refrigeration & Air conditioning systems:** - Description of Vapour Compression and Vapour Absorption systems

**UNIT-IV: Engineering Materials:**

Classification, mechanical properties, Ferrous Materials – Constituents of Cast Iron & types of Cast Iron, Steels – manufacture by Bessemer converter, Arc furnace, types of steel, effect of alloying elements on steel, Stainless steel, Non- Ferrous Materials: Properties and applications of Aluminum & alloys, Copper and alloys, composite materials – types, fabrication methods, Ceramics – Properties and applications

**UNIT-V: Transmission of Motion and Power:**

Shafting, Belt drive, types of belt drive, types of belts, chain drives, types of chain drive, Pulleys, parts, types of pulleys, gear drive- classification, Terminology of spur gear, Gear trains – simple and compound, Clutches – purpose and basic principle of contact clutch, brakes - purpose and basic principle of block brake.

**UNIT-VI: Robot and sensors:**

Introduction, definition, Robot component, **CNC Machine tools** – Introduction, Machine control, Vertical and Horizontal spindles, CNC drill, mill, boring and tapping, Adaptive control, NC and CNC turning centers.

**TEXT BOOKS:**

1. Mathur, M.L., Mehta, F.S. and Tiwari, R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2005.
2. R.K. Rajput, “Elements of Mechanical Engineering”, Laxmi Publications, 1994.

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H: High      M: Medium      L: Low

**Syllabus for B. Tech II Year I semester  
Electrical and Electronics Engineering (EEE)**

**ENVIRONMENTAL SCIENCE AND ECOLOGY  
Common to All Branches**

**Code: 7HC21**

**L   T   P   C**  
**3   0   0   0**

II B. Tech I Sem (for EEE, ME and ECE)  
II B. Tech II Sem (for CSE, IT, ECM and CE)  
(Mandatory course)

There are no credits but grading will be given based on marks scored as **Outstanding/ Excellent/ Very good/ Good/ Above average/ Average/ Satisfactory/Not satisfactory**

**Course Objectives:**

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations Course Outcomes:
- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

**UNIT-I Ecosystems:** Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity.

**UNIT-II Natural Resources:** Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source.

**UNIT-III Biodiversity And Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

**UNIT-IV Environmental Pollution and Control Technologies:** Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants. Acid rain, Global warming, Ozone layer depletion, Water pollution: Sources and types of pollution. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Sewage water Treatment, Kyoto protocol, and Montréal Protocol.

**UNIT-V Sustainable development and Green Technology:** Concept of sustainable development, threats to sustainability population and its explosion, Crazy consumerism, over- exploitation of resources, strategies for achieving sustainable development environmental education, conservation of resources, urban sprawl sustainable cities and sustainable communities, human health , role of IT in

Environment, Environmental Ethics, Environmental Economic – Concept of Green Building, Clean Development Mechanism ( CDM ).

**UNIT-VI Environmental Policy, Legislation & Environment Impact Assessment:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

**TEXT BOOKS:**

1. Introduction to Environmental Science Dr. Y. Anjaneyulu, 2004, BS Publications.
2. Environmental Studies by Erach Bharucha, 2005 University Press.

**REFERENCE BOOKS:**

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

				H: High			M: Medium			L: Low		
a	b	c	d	e	f	g	h	i	j	k	l	m
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**II Year, I - Sem.**  
**Electrical and Electronics Engineering**  
**ELECTRONIC DEVICES & CIRCUITS LAB**  
 (Common to ECE/ECM/EEE)

Code: 7C371

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
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**PART A: Electronic Workshop Practice (in 3 lab sessions):**

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.
2. Identification and Specifications of Active Devices like Diodes, BJTs, JFETs, MOSFETs.
3. Study and operation of
  - Multimeters (Analog and Digital)
  - Function Generator
  - Regulated Power Supplies

**PART B: (For Laboratory examination – Minimum of 10 experiments)**

1. Study and Operation of CRO:  
Oscilloscope, CRT features vertical amplifiers, horizontal deflection system, sweep, triggerPulse, delay line, sync selector circuits, Dual trace oscilloscope, standard specifications of CRO, probes for CRO, Measurement of amplitude and frequency. Time Period measurement, Lissajous patterns.
2. PN Junction diode characteristics A. Forward bias B. Reverse bias.
3. Zener diode characteristics
4. Transistor CB characteristics (Input and Output)
5. Transistor CE characteristics (Input and Output)
6. Half wave Rectifier with and without filters.
7. Full wave Rectifier (Centre tapped and Bridge)with and without filters
8. FET characteristics
9. CE Amplifier
10. CC Amplifier (Emitter Follower).
11. FET amplifier (Common Source)
12. RC Phase Shift Oscillator

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H: High                      M: Medium                      L: Low

**II Year I Semester**  
**Electrical and Electronics Engineering**  
**ELECTRICAL MACHINES LAB – I**

Code: 7A473

**L**            **T**            **P/D**        **C**  
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**The following experiments are required to be conducted:**

1. Magnetization characteristics of DC shunt generator for the calculation of critical field resistance and critical speed.
2. Determination of characteristics from the Load test on DC shunt generator.
3. Determination of characteristics from the Load test on DC series generator.
4. Determination of characteristics from the Load test on DC compound generator.
5. Hopkinson's test on DC shunt machines for the determination of the efficiency.
6. Fields test on DC series machines for the determination of efficiency.
7. Swinburne's test and speed control of DC shunt motor and Predetermination of efficiencies.
8. Brake test on DC compound motor for the determination of performance curves.
9. Brake test on DC shunt motor for the determination of performance curves.
10. Separation of losses in DC shunt motor.

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H: High      M: Medium      L: Low

**II Year I semester**  
**Electrical and Electronics Engineering**  
**Technical Seminar - III**

L   T   P/D   C

Code: 7A393

-   -   2   1

**Course objective**

Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

**COURSE OUTCOMES :**

- 1 Deliver lecture on emerging technologies.
- 2 Explain domain knowledge to resolve real time technical issues
- 3 Demonstrate ability to lead and explain concepts and innovative ideas.
- 4 Demonstrate team leading qualities.
- 5 Demonstrate public speaking skills.
- 6 Exchange new information that would not have been available otherwise.
7. Develop debating and interview skills.

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week)	: 10 marks
End semester Viva	: 20 marks
<b>Total</b>	<b>100 marks</b>



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H: High                  M: Medium                  L: Low

**II Year II Semester****Electrical and Electronics Engineering**

Code: 7HC15

**PROBABILITY THEORY AND STATISTICS**

L T P/D C

(Common to All Branches)

2 -- -- 2

**Pre Requisites:** Nil**Course Objectives:** *Students are expected to learn*

1. Basic concepts of probability and able to evaluate probability.
2. Concepts on discrete probability distributions and methods to solve problems.
3. Concepts on continuous probability distributions and methods.
4. About the concepts on correlation and regression
5. Basic concepts of testing of hypothesis for large size samples and methods to solve problems.
6. Test the hypothesis related to small size samples.

**UNIT-I: BASIC PROBABILITY:**

Probability spaces, conditional probability, independent events, and Bayes' theorem.

Random variables: Discrete and continuous random variables, Expectation of Random Variables, Moments, Variance of random variables, Chebyshev's Inequality

**UNIT-II: DISCRETE PROBABILITY DISTRIBUTIONS:**

Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution

**UNIT-III: CONTINUOUS RANDOM VARIABLE & DISTRIBUTIONS:**

Continuous random variables and their properties, distribution functions and densities,

Normal, exponential and gamma distributions, evaluation of statistical parameters for these distributions

**UNIT-IV: APPLIED STATISTICS:**

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves; Correlation and regression – Rank correlation.

**UNIT-V: TESTS OF HYPOTHESIS FOR LARGE SAMPLES:**

Tests of Hypothesis, Type-I and Type-II Errors, Hypothesis testing concerning one mean and two means and test of hypothesis concerning to one Proportion and difference of proportions.

**UNIT-VI: TESTS OF HYPOTHESIS FOR SMALL SAMPLES:**Student t-test, Hypothesis testing concerning one mean and two Means, F-test and  $\chi^2$  test-Goodness of fit, Independence of Attributes.**TEXT BOOKS:**

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9<sup>th</sup> Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham, M.V.S.S.N. Prasad, S. Chand Publications.

**REFERENCE BOOKS:**

1. Miller and Freund's, Probability and Statistics for Engineers, 8<sup>th</sup> Edition, Pearson Education.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.
3. A.Ross, A First Course in Probability, 6<sup>th</sup> Ed., Pearson Education India, 2002.

**Course Outcomes:** *After the course completion the students will be able to solve*

1. *The random variable problems and probability distributions.*
2. *Problems on discrete probability distributions.*
3. *Problems on continuous probability distributions*
4. *Problems on curve fitting, correlation and regression.*
5. *Test the hypothesis related to samples concerning to the means and proportions of large size samples.*
6. *Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.*

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H: High                      M: Medium                      L: Low

**II Year II Semester  
Electrical and Electronics Engineering  
ELECTRICAL MACHINES-II**

**Code: 7A405**

**L            T            P/D    C**  
**3           -           -           3**

**Course Objective:** Students learn about fundamental concepts of transformers and induction motors with applications.

**Course Outcomes:** Students

1. Learn basic concepts of single phase transformer.
2. Study about testing of single phase transformer and auto transformer.
3. Study about poly phase transformer.
4. Study about poly phase induction motors.
5. Study about torque speed characteristics and circle diagram of induction motor.
6. Study about different starting methods of induction motor.

**UNIT-I SINGLE PHASE TRANSFORMERS – CONSTRUCTION, OPERATION AND PERFORMANCE:**

Single phase transformers-types - constructional details-minimization of hysteresis and eddy current losses-emf equation - operation on no load and on load - phasor diagrams- Equivalent circuit - losses and efficiency-regulation. All day efficiency - Effect of variations of frequency & supply voltage on iron losses

**UNIT-II - TESTING OF SINGLE PHASE TRANSFORMER AND AUTOTRANSFORMER:**

OC and SC tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses test-parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit - comparison with two winding transformers.

**UNIT-III - POLYPHASE TRANSFORMER:**

Polyphase transformers - Polyphase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ, Third harmonics in phase voltages-three winding transformers-tertiary windings-determination of  $Z_p$ ,  $Z_s$  and  $Z_t$  transients in switching - off load and on load tap changing; Scott connection.

**UNIT- IV POLYPHASE INDUCTION MOTORS:**

Polyphase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation- Rotor power input, rotor copper loss and mechanical power developed and their inter relation.

**UNIT-V - TORQUE- SPEED CHARACTERISTICS AND CIRCLE DIAGRAM OF INDUCTION MOTORS:**

Torque equation-deduction from torque equation- expressions for maximum torque and starting torque - torque slip characteristic- Double cage and deep bar rotors - crawling and cogging - equivalent circuit - phasor diagram-Circle diagram-no load and blocked rotor tests-predetermination of performance.

**UNIT-VI METHODS OF STARTING AND SPEED CONTROL OF INDUCTION MOTOR:**

Methods of starting and starting current and torque calculations-Speed control-change of frequency; change of poles and methods of consequent poles; cascade connection. Injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

**TEXT BOOKS:**

1. Electrical machines- P S Bhimbra, Khanna Publishers.
2. Theory & Performance of Electrical Machines, J. B. Gupta, S.K. Kataria & Sons.

**REFERENCES:**

1. Performance and Design of AC Machines – MG. Say, BPB Publishers
2. Theory of Alternating Current Machinery – Langsdorf, Tata McGraw-Hill Companies, 2<sup>nd</sup> edition.
3. Electric Machines – I.J. Nagrath & D.P. Kothari, Tata Mc Graw Hill, 7<sup>th</sup> Edition, 2005.
4. Electric machinery - A.E. Fitzgerald, C. Kingsley and S. Umans, Mc Graw Hill Companies, 5<sup>th</sup> edition.

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	M	H		L							L

H: High      M: Medium      L: Low

## II Year II Semester

### Electrical and Electronics Engineering

#### POWER SYSTEMS - I

Code: 7A406

L      T      P/D      C  
3      1      -      3

**Course Objective:** Students learn about fundamental concepts of different conventional power generation methods and transmission requirements.

**Course Outcomes:** Students

1. Learn basic concepts of hydro electric and thermal power plants.
2. Study about gas and nuclear power plants.
3. Study about transmission line parameters and efficiency.
4. Study about performance of transmission lines.
5. Learn basic about over head insulators and mechanical design.
6. Learn fundamentals of underground cables.

#### UNIT -I HYDROELECTRIC POWER STATION:

Elements of hydro electric power station, Types, Concept of pumped storage plants, Storage requirements, Mass curve(explanation only) Estimation of power developed from a given catchments area, Heads and efficiencies

##### Thermal power stations:

Line diagram of Thermal Power Station (TPS) showing paths of coal, Steam, Water, Air, ash and flue gasses, Brief description of TPS components, Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

#### UNIT -II GAS AND NUCLEAR POWER STATIONS:

Nuclear Fission and Chain reaction, Nuclear fuels, Principle of operation of Nuclear reactor, Reactor Components, Moderators, Control rods, Reflectors and Coolants, Radiation hazards, Shielding and Safety precautions, Types of Nuclear reactors and brief description of PWR, BWR and FBR.

Gas Power Stations, Principle of Operation and Components (Block Diagram Approach Only).

#### UNIT-III TRANSMISSION LINE PARAMETERS:

Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

#### UNIT-IV PERFORMANCE OF SHORT, MEDIUM AND LONG LENGTH TRANSMISSION LINES:

Classification of Transmission Lines - Short, medium and long line and their model representations -Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models (numerical problems).

**UNIT-V OVERHEAD LINE INSULATORS:**

Types of Insulators, String efficiency and Methods for improvement, Numerical Problems – voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding.

**SAG AND TENSION CALCULATIONS:**

Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

Skin and Proximity effects - Description and effect on Resistance of Solid Conductors -Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line, Shunt Compensation. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

**UNIT-VI UNDERGROUND CABLES:**

Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading.

**TEXT BOOKS:**

1. A Text Book on Power System Engineering - M.L. Soni, P.V. Gupta, U.S. Bhatnagar, A. Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Electrical power systems - C.L. Wadhwa, New Age International (P) Limited, Publishers, 1998.

**REFERENCES:**

1. Power system Analysis- John J Grainger William D Stevenson, TMC Companies, 4<sup>th</sup> edition
2. Power System Analysis and Design - B.R. Gupta, Wheeler Publishing.
3. Power System Analysis - Hadi Saadat – TMH Edition.
4. Modern Power System Analysis - I.J. Nagaraj and D.P. Kothari, Tata McGraw Hill, 2<sup>nd</sup> Edition.

	1	2	3	4	5	6	7	8	9	10	11	12
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H: High      M: Medium      L: Low

**II Year II Semester**  
**Electrical and Electronics Engineering**  
**CONTROL SYSTEMS**

**Code: 7AC07**

L      T      P      C  
3      1      -      3

**Course Objective:** Students learn about fundamental concepts of time and frequency domain analysis of a given system.

**Course Outcomes:** Students

1. Learn basic concepts of control systems.
2. Study about time response analysis.
3. Learn basic concepts of stability and root locus method.
4. Study about frequency response analysis.
5. Learn basic concepts stability analysis in frequency domain.
6. Learn fundamentals of state space analysis.

**UNIT – I INTRODUCTION:**

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions – Translational and Rotational mechanical systems

**Transfer function representation:**

Transfer Function of Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

**UNIT-II TIME RESPONSE ANALYSIS:**

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems, PID controllers.

**UNIT – III STABILITY ANALYSIS IN S-DOMAIN:**

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.

**Root Locus Technique:** The root locus concept - construction of root loci-effects of adding poles and zeros to  $G(s)H(s)$  on the root loci.

**UNIT – IV FREQUENCY RESPONSE ANALYSIS:**

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

**UNIT – V STABILITY ANALYSIS IN FREQUENCY DOMAIN:**

Polar Plots-Nyquist Plots-Stability Analysis.

**CLASSICAL CONTROL DESIGN TECHNIQUES:** Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain.

**UNIT – VI STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:**

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

**TEXT BOOKS:**

1. Automatic Control Systems 8th edition –B. C. Kuo 2003– John wiley and sons.
2. Control Systems Engineering – I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2<sup>nd</sup> edition.

**REFERENCES:**

1. Modern Control Engineering – Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3<sup>rd</sup> edition, 1998.
2. Control Systems – N.K. Sinha, New Age International (P) Limited Publishers, 3<sup>rd</sup> Edition, 1998.
3. Control Systems Engg. – NISE 3<sup>rd</sup> Edition – John wiley.
4. “Modeling & Control of Dynamic Systems” – Narciso F. Macia George J. Thaler, Thomson Publishers.



**II Year II Semester  
Electrical and Electronics Engineering**

**L      T      P      C**  
**3      -      -      3**

**CODE : 7C405**

**ANALOG CIRCUITS**

**Course Objectives:**

*To understand the basic functioning and applications of various devices such as amplifiers and oscillators.*

**COURSE OUTCOMES:**

*After studying this course, the students will be able to*

1. *Understand Power Amplifiers*
2. *Analyze and Design tuned and RF amplifiers such as single tuned, double tuned, stagger tuned and wide band amplifier.*
3. *Understand the responses and applications of RC and RL circuits, basic operations of clippers, Clampers*  
*Understand different types multivibrators, their analysis, designing and applications*
5. *Understand different sweep generators and comparisons*
6. *Understand types of Logic gates and Sampling gates.*

***Mapping of Course Outcomes with Program Outcomes***

	a	b	c	d	e	f	g	h	i	j	k	l	m
CO1	3	2	2									2	3
CO2	3	2	2									2	3
CO3	3	2	2									2	3
CO4	3	2	2									2	3
CO5	3	2	2									2	3
CO6	3	2	2									2	3

**UNIT I: POWER AMPLIFIERS**

Classification of Power Amplifiers - Class A, B, AB & C power amplifiers –push pull configuration, complementary symmetry circuits, Distortion in Amplifiers. Harmonic distortion and Crossover Distortion in Power Amplifiers– Conversion efficiency and relative performance.

**UNIT II: TUNED AND RF AMPLIFIERS**

Introduction to Tuned Amplifiers, Q-Factor. single tuned capacitive coupled amplifier, tapped single tuned capacitance coupled amplifier, single tuned inductively coupled amplifier, stagger tuning, synchronous tuned Amplifier.

**UNIT III: WAVE SHAPING:**

RC high pass, low pass circuit response for sinusoidal, step, pulse, square, ramp & exponential inputs- Differentiator –Integrator. RL, Diode clippers- Transistor clipper- clipping at two independent levels – Emitter coupled clipper- comparator– Applications of voltage comparators. Clamping operation – clamping with source, diode resistances- clamping circuits theorem- practical clamping circuits.

**UNIT IV: MULTIVIBRATORS:**

Stable states of Bistable Multivibrator A fixed bias transistor Bistable Multivibrator -A self biased transistor Bistable Multivibrator - commutating capacitor – Unsymmetric triggering of Bistable Multivibrator - triggering through a unilateral device- symmetrical triggering – Schmitt trigger circuit. General operation of monostable multivibrator, collector coupled monostablemultivibrator - wave forms of collector coupled monostable multivibrator - Emitter coupled monostablemultivibrator - triggering of monostable multivibrator. Astablemultivibrator, collector coupled Astable multivibrator -Emitter coupled Astable multivibrator. Designing of Bistable, Monostable and Astable Multivibrators.

**UNIT V: TIME BASE GENERATORS:**

General features of time base signals-sweep circuit using a transistor switch-UJT,UJT characteristics, UJT as a sweep circuit, - General considerations & principles of Miller & Boot strap time base generators- the transistor miller time base- the transistor, Boot strap time base generator- A simple current sweep transistor current time base generator.

**UNIT VI: SAMPLING GATES:**

Basic operating principle unidirectional, Bidirectional sampling gates using diodes, transistors- reduction of pedessed sampling scope.

**LOGIC GATES:** Digital operation of a system- OR, AND, NOT, NAND & NOR gates- DTL Logic– RTL Logic, TTL logic – comparison.

**TEXT BOOKS:**

1. Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972
2. Pulse digital and switching wave forms-J. Millman and H. Taub, Tata McGraw-Hill, New Delhi,2001.
3. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .

**REFERENCES:**

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss
3. Electronic Circuit Analysis-K.Lal Kishore, 2004, BSP

a	b	c	d	e	f	g	h	i	j	k	l

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### II Year II Semester

#### Electrical and Electronics Engineering

**CODE: 7ZC01 MANAGEMENT SCIENCE AND FINANCIAL ACCOUNTING (MSFA)**

**Course Objective:** To make students understand the basics of management and Financial Accounting, its principles, practices and latest concepts for increasing the performance of engineering graduates in their respective fields, which facilitate them in making better planning and decisions

#### **Course Outcomes:**

1. Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
2. Helps in understanding organization behavior, personality determinants and other key aspects
3. Infers the need to understand the importance of Strategic management and Business environment in particular
4. Enrich students with basic concepts of Financial Accounting.
5. Understand basic concepts of Depreciation and need for preparing trial balance.
6. Helps in preparation of Financial Statements (final accounts).

#### **UNIT I: INTRODUCTION TO MANAGEMENT:**

Management- Definitions, Levels of Management, Functions of management- Planning: types of planning, planning process; Organizing: Organizational Design and Structure, Staffing; Directing; Controlling: Basic control process- Fayol's principles of Management - Taylor's principles of scientific management- Maslow's Motivational theory.

#### **UNIT II: INTRODUCTION TO ORGANIZATIONAL BEHAVIOR:**

Definition, Nature and Scope of OB, Personality-determinants of Personality – Perception- Attitudes- Attribution theory- Johari Window and Transactional Analysis, Stress Management- factors and remedies

#### **UNIT III: STRATEGIC MANAGEMENT:**

Introduction to Strategic Management, Vision, Mission, Goals, Objectives, Environmental Scanning- PESTEL, SWOT Analysis, Competitive Advantage, Concept of Core Competence, PORTER's five force model, types of strategies, Strategic formulation and Implementation.

#### **UNIT IV: FUNDAMENTALS OF FINANCIAL ACCOUNTING:**

Definition of Accounting, Accounting Concepts and conventions, principles of Double-Entry system, Book Keeping, Overview of books of original records Journal, Ledger and Subsidiary books

**UNIT V: TRIAL BALANCE AND DEPRECIATION OF FIXED ASSETS:** Significance of Trial balance, Preparation of trial balance Definition of Depreciation, Depreciation of fixed assets, Methods of Depreciation – Straight line method and Diminishing Balance method

**UNIT VI: CLASSIFICATION OF REVENUE AND CAPITAL EXPENSES, AND PREPARATION OF FINAL ACCOUNTS:**

Revenue expenditure, Capital expenditure, Preparation of Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments

**REFERENCES:**

1. A R Aryasri: Management Science, Tata Mc Graw Hill
2. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi
3. A R Aryasri: Managerial Economics and Financial Analysis, Tata Mc Graw Hill

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H: High			M: Medium			L: Low					

**II Year II Semester**  
**Electrical and Electronics Engineering**  
**COMPREHENSIVE VIVA VOCE-I**

**Code: 7A472**

**L T P/D C**

**Course Objective:**

Evaluate, comprehend and assess of the concepts and the knowledge gained in the core courses of the first and the second year.

- - - 1

**Course Outcomes :**

**At the end of this course, the student will be able to**

1. Comprehend the concepts in the core and elective courses.
2. Exhibit technical knowledge to face interviews.
3. Exhibit lifelong Learning skills for higher education and to pursue Professional practice.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external evaluation.

**Internal:**

Comprehensive Viva Voce is Conducted twice in a semester and evaluated for 15 marks each.

End examination : 70 Marks.

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
	x	x	x					x			

**II year B.Tech – II Sem****Code: 7A475****CONTROL SYSTEMS AND SIMULATION LAB**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>1</b>

**Course Outcomes:** After completing this course, student shall be able to

1. An ability to explore the applications of control systems.
2. An ability to explore the concepts of control systems.

**The following experiments are to be conducted:**

1. Time response of Second order system
2. Characteristics of Synchro
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Lag and lead compensation – Magnitude and phase plot
7. Characteristics of magnetic amplifiers
8. Characteristics of AC servo motor
9. PSPICE simulation of Op-Amp based Integrator and Differentiator circuits.
10. Linear system analysis (Time domain analysis, Error analysis) using MATLAB and State space model for classical transfer function using MATLAB
11. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB

**REFERENCE BOOKS:**

1. Simulation of Electrical and electronics Circuits using PSPICE –M.H. Rashid, M/s PHI Publications.
2. PSPICE A/D user's manual – Microsim, USA.
3. MATLAB and its Tool Books user's manual and – Mathworks, USA.

1	2	3	4	5	6	7	8	9	10	11	12
M	H	M	M					M		M	

H: High      M: Medium      L: Low

**II Year II Semester  
Electrical and Electronics Engineering  
Analog Circuits Lab**

Code: 7C473

										L	T	P/D	C
										-	-	2	1
a	b	c	d	e	f	g	h	i	j	k	l		
	x	x	x	x						x	x		

**Course Objectives:** To prepare students to practice the design and analysis of any Analog electronics circuit.

**Course Outcomes:**

**At the end of the laboratory course, the students will be able to**

1. To understand the design and working of various linear and non-linear wave shaping circuits.
2. To demonstrate the working principle of various multivibrators.
3. To verify the functionalities of various logic gates.
4. To perform and verify the BJT/ FET and feedback amplifiers.
5. To perform and verify the working of oscillators and voltage regulators.
6. To perform laboratory experiment to verify the conversion efficiency of various power amplifiers.

**Syllabus Content:**

**Part-A: Hardware based experiments**

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers, Clampers.
3. UJT Relaxation Oscillator
4. Astable and monostable Multivibrator.
5. Bistable Multivibrator.
6. Study of Logic Gates with discrete components.

**Part-B: Software Simulation based experiments (Multisim OR Pspice OR Tina Pro Or Equivalent Simulation Software)**

1. Common Emitter and Common Source amplifier
2. Voltage shunt and Feedback Amplifier
3. Cascade Amplifier (CE+CE, CE+CC)
4. RC Phase Shift Oscillator using Transistors
5. Class- A and Class-B Complementary Symmetry Power Amplifier
6. Series and Shunt Voltage Regulator.

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H: High				M: Medium				L: Low			

**II Year II Semester**  
**Electrical and Electronics Engineering**  
**TECHNICAL SEMINAR - IV**

Code: 7A494

L	T	P/D	C
-	-	2	1

**Course objective**

Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

**COURSE OUTCOMES:**

- 1 Deliver lecture on emerging technologies.
- 2 Explain domain knowledge to resolve real time technical issues
- 3 Demonstrate ability to lead and explain concepts and innovative ideas.
- 4 Demonstrate team leading qualities.
- 5 Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.
- 6 Exchange new information that would not have been available otherwise.
- 7 Develop debating and interview skills.

**Procedure**

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

**Distribution of marks**

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week)	: 10 marks
End semester Viva	: 20 marks
<b>Total</b>	<b>100 marks</b>